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The INDUSTRIAL-ARTS MAGAZINE

SEPTEMBER - 1926

The Bruce Publishing Company
- Milwaukee, Wisconsin -

MR. HAPPY MAN SAYS—

"It's all in the grind. Life is a huge grindstone — some people are ground down—others are polished up—it all depends on the kind of 'stuff' that's in them.

A Saw is a lot like a man —what it is when it comes from the grindstone depends upon the material it is made of. No amount of grinding will make up for 'poor stuff.' And on the other hand, much of the ***good service*** of Atkins Silver Steel Saws comes from their ***exclusive two way taper grinding***."

Send for Atkins new Text Book on Hand, Rip and Panel Saws —Free.

E.C. ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE

Home Office and Factory, INDIANAPOLIS, INDIANA

Canadian Factory, Hamilton Ontario

Machine Knife Factory, Lancaster N.Y.

Branches Carrying Complete Stocks In The Following Cities:

Atlanta
Memphis
Chicago
Minneapolis
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New York City
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Paris, France
Vancouver, B.C.

ATKINS ALWAYS AHEAD
AAA
TRADE MARK
E.C. ATKINS & CO. INDIANAPOLIS, IND.

ATKINS SILVER STEEL SAWS

Stretch that Appropriation By BUYING RIGHT

HOW do you buy? Pick up a half-pint of this and a gallon of that as you need it? Or, just tell Jones' Paint Store to send up this assortment of Nameless Varnish and any kind of Enamel? And then wonder why the boys have trouble and where the money goes?

Why not use JOHNSON'S WOOD FINISHES at SCHOOL PRICES? Get the highest grade materials made, purchase them in quantities and save money.

Johnson quality is unsurpassed. You probably have used Johnson Wood Dye and Johnson's Wax for years. The entire Johnson line is the kind of reliable trouble-proof material that actually helps "teach". It includes:

VARNISHES	FILLERS	ENAMELS
UNDER-LAC	WAXES	UNDERCOATS

WOOD DYES (both OIL STAIN and SPIRIT STAIN)

Write for Johnson Catalog and School Prices Today!

Job Sheets

Johnson Job Sheets on Wood Finishing cover the application of Stain, Filler, Under-Lac (shellac), Enamel, Undercoat, Wax, Varnish and Varnish Rubbing. They combine the latest and best educational practice with the most expert practical experience. And to all users of Johnson Finishes they are FREE. For a small set of Johnson Job Sheets on Wood Finishing, mail coupon at right.

S. C. JOHNSON & SON, Dept. I. A. 9 RACINE, WIS.
"The Wood Finishing Authorities"

☐ Please send specimen set of Johnson Job Sheets.

☐ Also include latest Johnson School Price List on shop materials.

☐ We are redecorating school buildings in the near future and are interested in saving money on decorating materials.

NAME .....

POSITION .....

SCHOOL .....

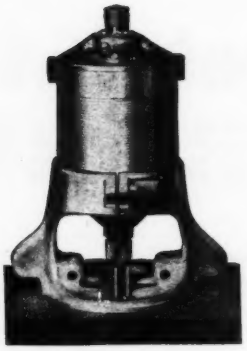
CITY & STATE .....

Now is the Time
To Start Putting Out *Finished* Work

These Two Machines Will Do It All

WITH THE ROUTER (shown at the right) you can do veining, two-tone work, lining, panel sinking, cutting out for line and block inlays, making block inlays, imitation hand carving and (with Beader and Fluter Attachment, $15.00 extra) beading or fluting of floor lamps, table legs, etc., rounding corners, beading or cutting coves on corners.

WITH THE SHAPER (shown below) used both as a bench and a portable machine, students can do as large shaping as you will ever want to do with absolute safety. It can also be used as a jointer.



1/7 H.P. Router
Runs from lighting or power line.
Price $46.50

¼ H.P. Shaper and Jointer. Runs from lighting or power line.
Price Complete (except cutters).....$121.00

In Use From Coast to Coast

Hundreds of Grammar Schools, High Schools and Colleges from coast to coast are using these machines in their Manual Training, Printing and Maintenance Departments. Upon request we shall be glad to furnish a list of schools nearest to you.

MOST VALUABLE REGARDLESS OF COST. COSTS LITTLE.

R. L. CARTER CO., INC.
1208 Chestnut St.
Phoenix, N. Y.
Please send me a catalog and requisition blank with suggestions.
Name.....
School.....
Address.....

Make Your Products a Source of Pride to Your School, Yourself, Your Students and Their Parents.

THE R. L. CARTER CO., INC.
1208 Chestnut St.
Phoenix, N. Y.

CARTER PRODUCTS

Let your choice be the choice of experts

The expert woodsman, the skilled lumber mill operator, the experienced carpenter, the cabinet maker, the man who cuts metal — this jury of saw experts chooses Disston for fast, easy sawing for clean, accurate cutting.

Boys do better work with a Disston Band Saw on the machine.

The saw experts of the world select Disston Saws for themselves.

Not on faith . . . but on performance. They have learned what Disston Steel means; and Disston hardening and tempering; setting and filing; workmanship and finish.

Your school shop, too, needs the saws that experts use—for many reasons.

You can get more work done in each period with saws that stay in shape.

Boys can do neater and better work with a keen, sharp saw that holds its tension.

Your shop costs are less on a yearly basis. Disston Saws need less grinding, less tensioning. They stay on the machines and turn out work, week after week.

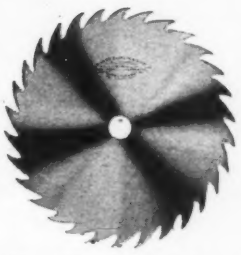
If you are using Disston Band and Circular Saws they need no recommendation. If you are not—specify Disston on your next requisition and let them prove the difference right in your own shop.

You can get Disston Band and Circular Saws for all types of machines; the largest and the new, smaller machines

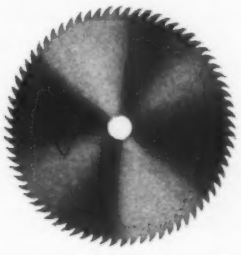
HENRY DISSTON & SONS, INC.,
Makers of "The Saw Most Carpenters Use"
Philadelphia, U. S. A.

DISSTON

SAWS TOOLS FILES KNIVES STEEL



The Disston Saw for ripping. Disston grinding methods and Disston tensioning insure easy accurate cutting and prevent binding. Disston Steel keeps the teeth sharp.



Here is the Disston Saw for cross-cutting. Made of Disston Steel, hardened and tempered by Disston methods to cut fast and stay sharp.

The Disston Combination or Smooth Cutting Saw makes a smooth cut that requires no sanding or dressing. A very popular saw in school shops. Cross-cuts or rips equally well. Hollow ground for clearance. No setting or swaging necessary.

SIMONDS
Blue Ribbon Hand Saws

No. 371

No. 372

No. 71

No. 72

Here are four of the best made saws—Simonds Blue Ribbon line Hand Saws. They hold their edge longer and cut smooth. The hang and balance are perfect. For school woodworking shops they are the best investment. Write for catalog and prices.

Simonds Saw and Steel Co.

Established 1832 Fitchburg, Mass.

Good Work *Demands* Good Machines

This motor driven hand jointer is as safe as it is dependable—as versatile as it is accurate. It will help you to teach your pupils to appreciate good tools while training them to be good workmen.

When you write inquire about our Sander, Universal Saw Bench, Lathe and other American manual training equipment.

AMERICAN
SAW MILL MACHINERY CO.
MAKERS OF WOODWORKING AND SAW MILL MACHINERY
74 MAIN STREET, HACKETTSTOWN, N. J.

Improve Your Shop Equipment

Huther Bros. Dado Head

A Huther Brothers Dado Head will speed up and simplify your intricate cutting and grooving. It consists of two outside cutters and enough inside cutters to perform the required cut. The cutters can be used in pairs or in any combinations desired.

Huther Bros. Cutter Head

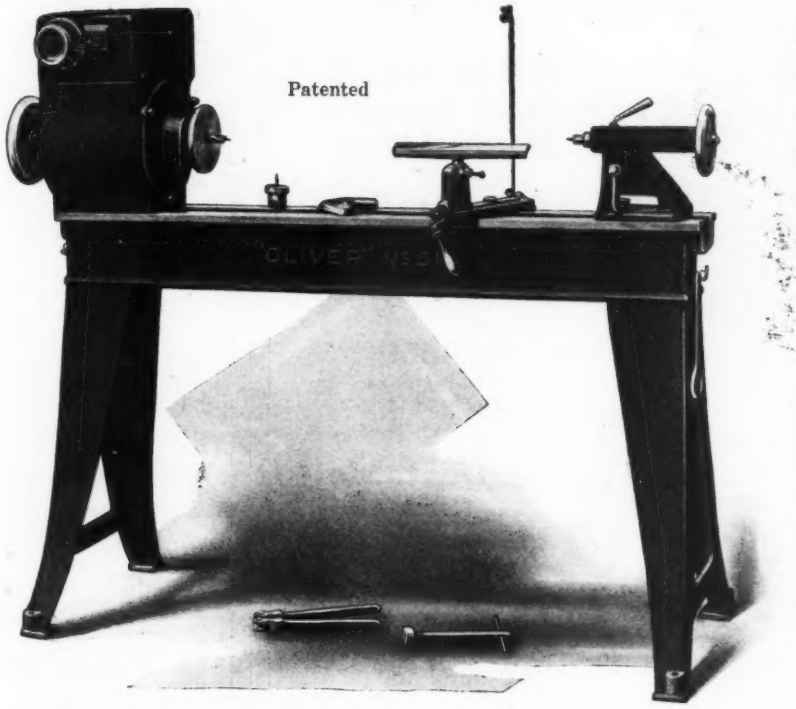
Huther Brothers Round Cutter Head is especially desirable for jointing and running light mouldings on saw mandrels. The knives are set with the use of a headless set screw and flanged side plates strengthen the head and keep knives from twisting while being set.

HUTHER BROTHERS SAW MANUFACTURING COMPANY
Rochester, N. Y.
Makers of Better Saws for More Than 50 Years

Write for catalog No. 46 illustrating and describing the entire Huther Line.

"Oliver" Speed Lathes

A NEW TYPE OFFERED



Here is the "Oliver" Four Speed Motor Head Stock Speed Lathe. It is the simplest A. C. Motor Head Stock yet developed.

The Controller is built on the motor head as a unit. This motor-controller can be purchased as a unit and mounted on the bed of your old style lathes, converting them into motor-head type.

Not only the 4-speed type but the adjustable speed head stock giving full range of speeds from 600 to 3600 R.P.M. is also offered with controller and motor built as a unit —all wired—ready for business. Any phase, any cycle and voltage can be met.

This is just one of several types of Speed Lathes offered to meet your needs.

Let us know your needs and we will quote to suit your requirements.

Oliver Machinery Co.

1004 Coldbrook St.

GRAND RAPIDS, MICH.

No. 51 Speed Lathe, Western State Normal—Kalamazoo, Mich. Installed in 1923. Long enough to know how good it is. Write them for their opinion.

The Best Handscrews are the

TRADE MARK "Jorgensen" REG U S PAT OFF

The ORIGINAL Steel Spindle Hand Screw

It has stood the test of time and is now the recognized standard.

Adjustable to any angle, also made "Non-adjustable" when desired, for parallel clamping only.

12 SIZES
Length of Jaws
4 in. to 24 in.

Steel Nuts
Steel Spindles
Hard Maple Jaws

TRADE MARK "Jorgensen" REG U S PAT OFF

REG. DOM. OF CANADA
PAT. S.G.D.G. FRANCE
REG. BELGIUM
REG. HOLLAND
REG. GERMANY

Insist on getting the Genuine. Specify and LOOK FOR THE NAME

TRADE MARK "Jorgensen" REG U S PAT OFF

Send for new catalog No. 6-EE

Adjustable Clamp Company
424 North Ashland Ave. Chicago, Ill.

Hammacher, Schlemmer & Co., Distributors, New York.
Oliver Machinery Co., Distributors British Isles.

When Either Space or the Appropriation is Limited—

a Tannewitz Combination Woodworker will save the day. Compactly but very conveniently arranged it performs the functions of several machines with speed and perfect accuracy. It takes up little or no more space than any of the individual machines and involves but a fraction of their combined cost.

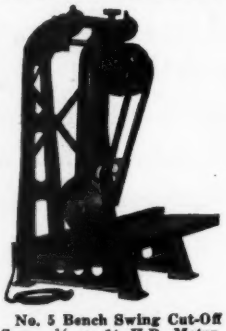
It will rip, cross-cut — mitre — bevel — groove — joint — dado — rabbet — plane — band saw — mould — mortise and bore.

It's a man's size machine on which three people can work simultaneously with absolute convenience and an unusual degree of safety; quality built in every detail — 2 H.P. Motor — ball bearing throughout — completely guarded — attachments put in motion without shifting belts.

To fully appreciate this machine study it in detail. Write for bulletin E-2.

THE TANNEWITZ WORKS
Grand Rapids, Mich. 303 Front Ave.

H.&A. PORTABLE ELECTRIC BENCH MACHINES FOR WOODWORKING AND PATTERN MAKING

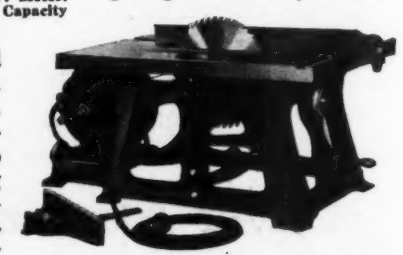


No. 5 Bench Swing Cut-Off Saw. ⅓ or ½ H.P. Motor. 8" diameter saw. Capacity 2" x 12" lumber.

More machines for the same money. More machine experience for your students. These machines are high grade, self-contained units that can be arranged for the best light and most convenience.

No additional installation costs. Hundreds in use giving satisfactory service.

Guaranteed accuracy. Ample power. Bronze bearings. Built to insure long life and satisfactory service. Ask for circulars giving full details.



No. 8 Bench Saw Table. ½ or ¾ H.P. Motor. 8" diameter saw. Capacity 2½" lumber. Table 15" x 20".

HESTON & ANDERSON
609 W. Depot Street, Fairfield, Iowa

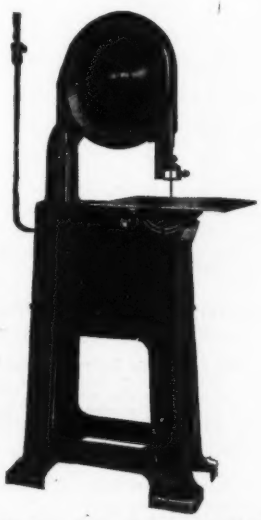
Wallace PORTABLE MACHINES

Built for Men
Safe for Boys

Everywhere accepted as

Standard *for* Schools

No. 8 Wallace Portable Universal Saw



No. 16 Wallace Portable 16" Band Saw

The same exclusive features which have won universal acceptance in business and industry, distinguish Wallace Portable Beltless Machines as ideal for practical school instruction.

VERSATILITY. There is power to spare for all shop woodworking. Each motor is an integral part of the machine itself. There are no belts to slip and waste power. Every woodworking contingency is anticipated in the structural and engineering design of Wallace Machines.

PORTABLE. Wallace Machines operate from any nearby electric light socket. They are light weight, can be quickly and easily moved from place to place. Surprisingly small floor space is required.

ACCURACY. Heavy planing mill machinery is out of place in the average school training shop. What schools need is light, portable cabinet making machinery. Wallace Machines are powerful enough to do the heaviest job, accurate enough to do the finest work with infinite precision.

SAFETY. Wallace Machines are so compactly designed that a boy can stand in a natural position with both feet firmly on the floor and do his work without leaning dangerously off balance to reach across a wide table. Every blade is carefully guarded. It is practically impossible for a Wallace Machine to injure the operator.*

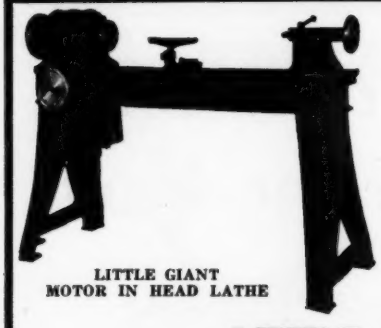
ECONOMY. Regardless of the amount of funds available for school equipment, it will pay you to examine the Wallace Catalog. The initial cost of Wallace Portable Beltless Machines is small. There is no installation expense. Upkeep is negligible.

FREE TRIAL. Write for the catalog. Send a request for any machine you want to try, cost-free and without incurring obligation. If trying a Wallace Machine for a week or more does not convince you, simply send it back, charges COLLECT. Send today for the Wallace Illustrated Catalog, and details of the trial offer. Let us put you on our mailing list for the Solar-Wallace Plan Service for Instructors. This includes illustrated job sheets which can be used as regular assignments. Send today.

J. D. WALLACE & CO.
140 S. California Ave., Chicago, Ill.

No. 6 Wallace Portable Jointer

**Wallace Portable Beltless Machines equipped with Wallace safety guards, approved wiring and plugs, are listed as standard by Underwriters Laboratories.*



LITTLE GIANT
MOTOR IN HEAD LATHE

LITTLE GIANT WOODWORKING LATHES FOR SCHOOLS are built in three styles. One style, our Model A, has the Motor Headstock; another style, our Model B, has underneath mounted motor; the third style, Model C, is belt driven. All come in any desired length from four feet to eight feet length of bed, centers two to six feet.

LITTLE GIANT BAND SAWS

are made either belt driven or motor driven and in sizes 12 in., 20 in., 24 in. and 36 in.

ARE THESE GOOD SHOP TOOLS?

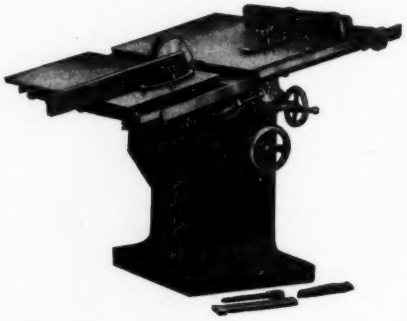
That's what you want to know. And here's the only really sure way to find out. Install Little Giant Lathes and Band Saws and if at any time within thirty days they are found to be other than perfectly satisfactory, notify us and we will take them back and pay the freight both ways. This is an offer whereby you will KNOW. You don't depend on anyone's sayso.

WRITE US FOR CATALOG.

LITTLE GIANT COMPANY

223 Rock St. Mankato, Minn.

LITTLE GIANT
BAND SAW



The No. 10 Crescent Saw Table is a sturdy, substantial machine with every convenient adjustment for general factory work and will meet every requirement for a practical saw table with self-contained motor for your manual training department.

Send today for circular giving complete description. Also ask for circular of band saws, saw tables, shapers, jointers, variety wood workers, planers and matchers, disk grinders, cut off table, swing saws, borers, hollow chisel mortiser, tenoner, universal wood workers, self feed rip saw.

THE CRESCENT MACHINE CO.

25 Main St.,

LEETONIA, OHIO.

No cutting tool is better than its edge
Keep the tools sharp

No. 475

PLURALITY OILSTONE TOOL GRINDER

THE most convenient, serviceable and efficient tool sharpening machine ever made.

This new Tool Grinder has been carefully designed to combine many new advantages with the essential features of older models. It combines five basic units in one machine: *coarse oilstone wheel, fine oilstone wheel, grinding cone, leather stropping wheel, emery wheel,* and all accessible from two adjacent sides.

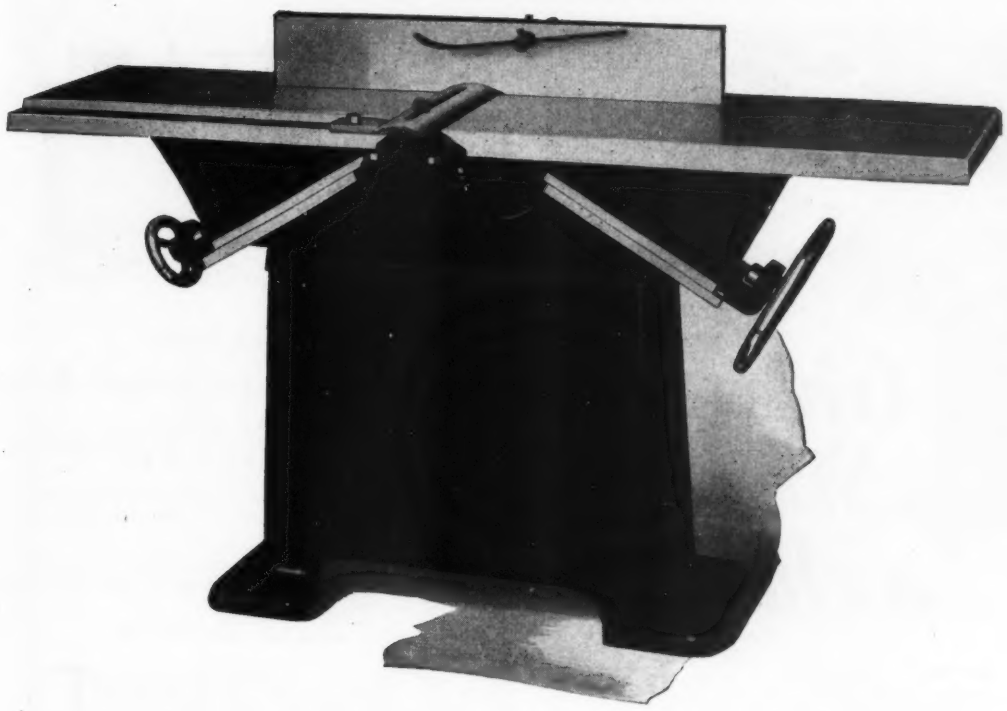
It is motor driven, ball bearing throughout, and every unit is thoroughly guarded.

Write for full descriptive bulletin.

MUMMERT-DIXON CO.

Hanover, Pa.

Originators and Pioneer Manufacturers of Oilstone Tool Grinders



An Efficient School Room Tool

IT'S MOTOR DRIVEN—easily placed in any position in the room to get best lighting and supervision. Saves power. No line shafting to pull. No power used when machine is idle.

IT'S ACCURATE—Cylinder head runs on SKF self-aligning ball bearings. Motor mounted directly on the cylinder head. Does smooth accurate work at all times and is not easy to get out of adjustment.

IT'S SAFE—may be had if desired with four knife safety head. All possible moving parts enclosed.

And it's priced at a figure that will set a new standard of jointer values. Write today for illustrated bulletin on this efficient, safe, machine. Address Dept. 409.

LET Sidney Engineers advise with you on machinery and shop arrangement problems. This service is free. Put your problems up to us.

P-W

Motor Driven Jointer

THE SIDNEY MACHINE TOOL CO., Sidney, Ohio.

Give every Student a chance~

Every student deserves actual practice with the most modern woodworking machines every time the class meets. School shops should be equipped to give each student an opportunity to learn by DOING rather than by watching. This is impossible with big bulky machines. It is positively unnecessary to buy large expensive machines, when, for the same amount of money you can install enough Unions to give every student a chance to learn MORE by actual experience.

Union Woodworking Machines are stripped of all useless bulk and weight. They are compact, rugged and speedy, possessing all the attributes of larger machines.

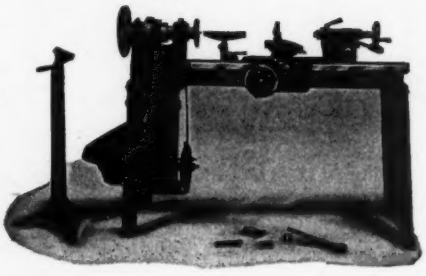
Unions are ideally adapted for school work. They make Woodworking easier to learn and easier to teach. Get the Facts. Write Today.

Send for this Catalog

It is FREE

GALLMEYER & LIVINGSTON CO.,
214 Straight Ave., Grand Rapids, Mich.

UNION PORTABLE AND BENCH TYPE WOOD WORKING MACHINES



This Lathe was built for School Work

BUILT for training purposes, the GTD general purpose lathe No. 218 possesses special features that you will find important.

Range of Work:—In addition to wood turning, its basic use, No. 218 may be used for many operations on metal.

Economy:—When appropriations for equipment are limited, No. 218 will cover your most important needs at low cost.

WRITE FOR BULLETIN 104.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

School Representatives

R. A. FIFE CORPORATION, Mamaroneck, N. Y.

KEYSTONE

Trustworthy Tools Are Important

Students learn more quickly and find a greater satisfaction in their school work if they have the advantage of good tools.

"Cleveland" Grindstones are produced with this thought in mind, which probably accounts for the fact that they are used by more schools than any other abrasive.

THE CLEVELAND STONE COMPANY
CLEVELAND, OHIO

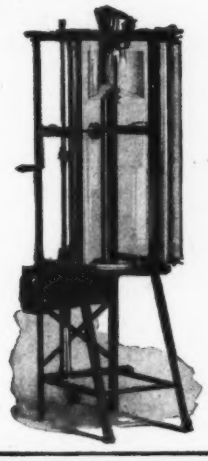
Grinding Wheel Factory, Tiffin, Ohio.

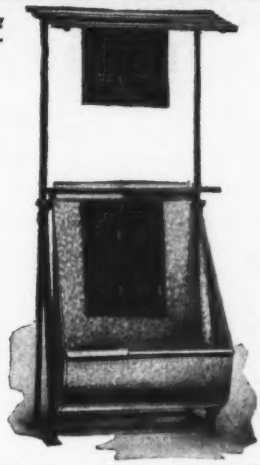
BRANCHES

NEW YORK
283 Front Street

CHICAGO
23 S. Jefferson Street

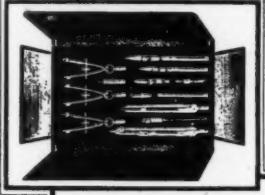
The Pease Junior Blue Printing Machine requires no special electrical connections.





The Pease Junior Sheet Washer provides a continuous spray of clear water for thorough washing.

Why not Modernize Your School Drafting Room?



No. 850 Schoenner 12-Piece Set

The Pease line of school drawing tables including seven types in various sizes and styles.

Teach your students how to make blue prints the modern way and earn an income for your school besides, with the Pease Junior Blue Printing Equipment—equipped with a Pease Universal Arc Lamp that will operate economically on 110 Volt or 220 Volt AC or DC current.

Speedy operation—perfect blue prints—durability and low price are only a few of the outstanding features of this new Pease Junior Equipment.

The complete line of Pease school drafting room supplies also includes Drawing Instruments, Drawing Boards and Tables, Map Cases and numerous other items, all illustrated and described in the Special School Catalog. Clip and mail the coupon for your copy.

The C. F. Pease Company
802 N. Franklin St.
Chicago, Illinois

Mail Today

The C. F. Pease Company,
802 N. Franklin St., Chicago

Gentlemen:

Please send me further information regarding Blue Printing Machinery, School Furniture and Drawing Instruments.

NAME .....
SCHOOL .....
STREET .....
CITY ..... STATE .....

PEASE

BLUE PRINTING MACHINERY

LET BLUE PRINTS TELL YOUR STORY

KEYSTONE COPPER STEEL

Steel Sheets that Resist Rust!

The destructive enemy of sheet metal is *rust.* It is successfully combated by the use of protective coatings, or by scientific alloying to resist corrosion. Well made steel with an alloy of Copper will last longest. Insist upon

KEYSTONE

Rust-Resisting Copper Steel

Black and Galvanized

Sheets

and Tin Plates

Keystone Copper Steel gives superior service for roofing, siding, gutters, spouting, culverts, tanks, and all forms of sheet metal work requiring highest rust-resistance. Send for *Facts* and other interesting booklets of value to shop instructors and craftsmen. We manufacture American Bessemer, American Open Hearth, and Keystone Copper Steel Sheets and Tin Plates for every use to which sheet metal is adapted—in industrial fields, in sheet metal shops, and for all lines of remanufacture.

Black Sheets for all purposes
Keystone Copper Steel Sheets
Apollo Best Bloom Galvanized Sheets
Apollo-Keystone Galvanized Sheets
Culvert, Flume, and Tank Stock
Formed Roofing and Siding Products
Automobile Sheets, Deep Drawing Sheets
Roofing Tin Plates—all grades
Bright Tin Plates, Black Plate, Etc.

Our Sheet and Tin Mill Products represent the highest standards of quality and utility, and are particularly suited to the requirements of the industrial shop, and the particular sheet metal worker. Sold by leading metal merchants and distributors.

American Sheet and Tin Plate Company
General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES
Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Pacific Coast Representatives: UNITED STATES STEEL PRODUCTS CO., San Francisco Los Angeles Portland Seattle

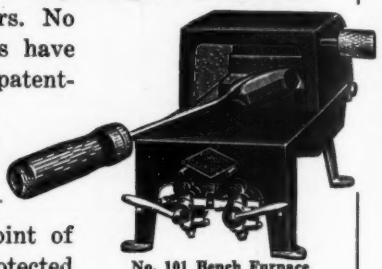
Export Representatives: UNITED STATES STEEL PRODUCTS CO., New York City

The JOHNSON Soldering Furnace

is used extensively by the Schools.

Because—

They are especially designed to heat soldering coppers. No other designs have the Johnson patented features giving more heat, quicker, with less gas. The point of the iron is protected and heated more uniformly by the curved hood and lined firebox.



No. 101 Bench Furnace

Do Not Require a Forced Air Blast.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co., San Francisco, Calif.
Eastern Representative: R. M. Henshaw, 1189 Eddy Street, Providence, R. I.

Ideal Sheet Metal Shop Layouts

By equipping your sheet metal shop with Niagara tools you will be giving your students an opportunity to learn modern sheet metal methods and take advantage of the increasing demand for trained operators.

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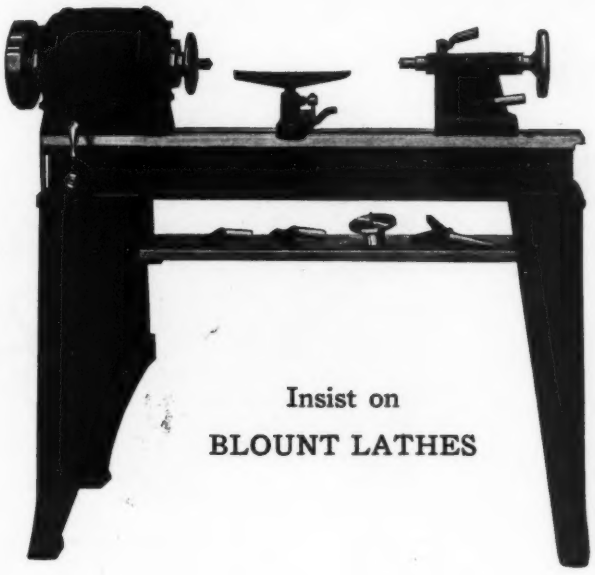

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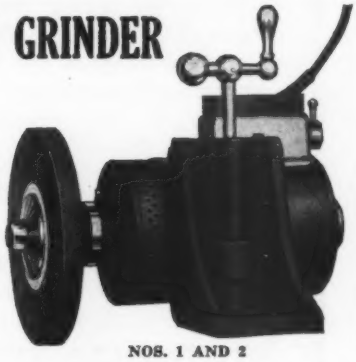

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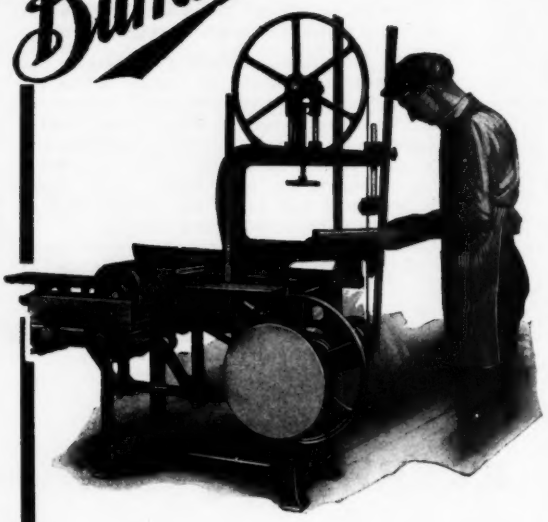

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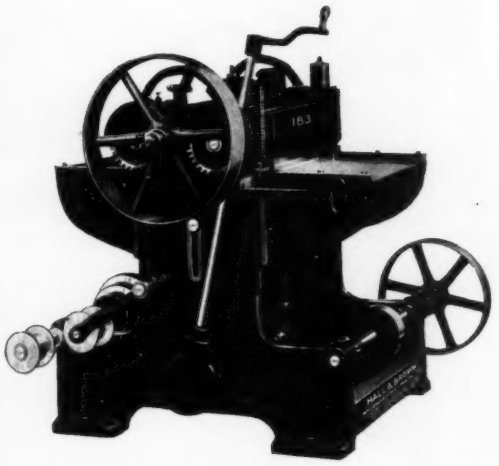

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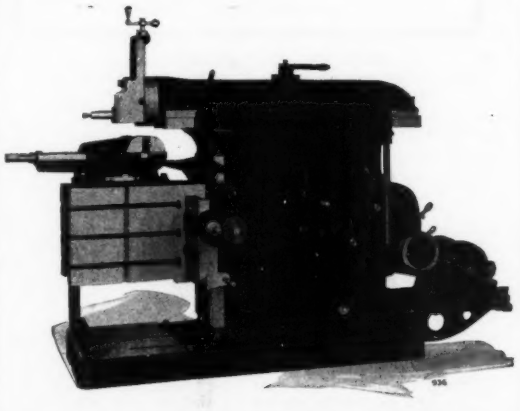

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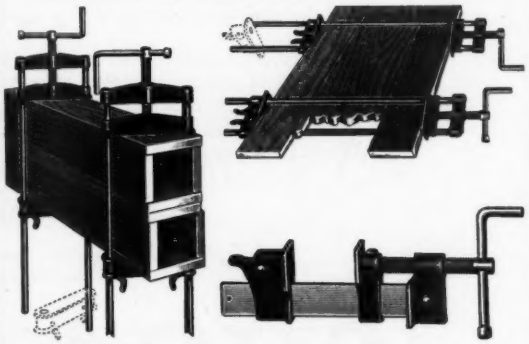

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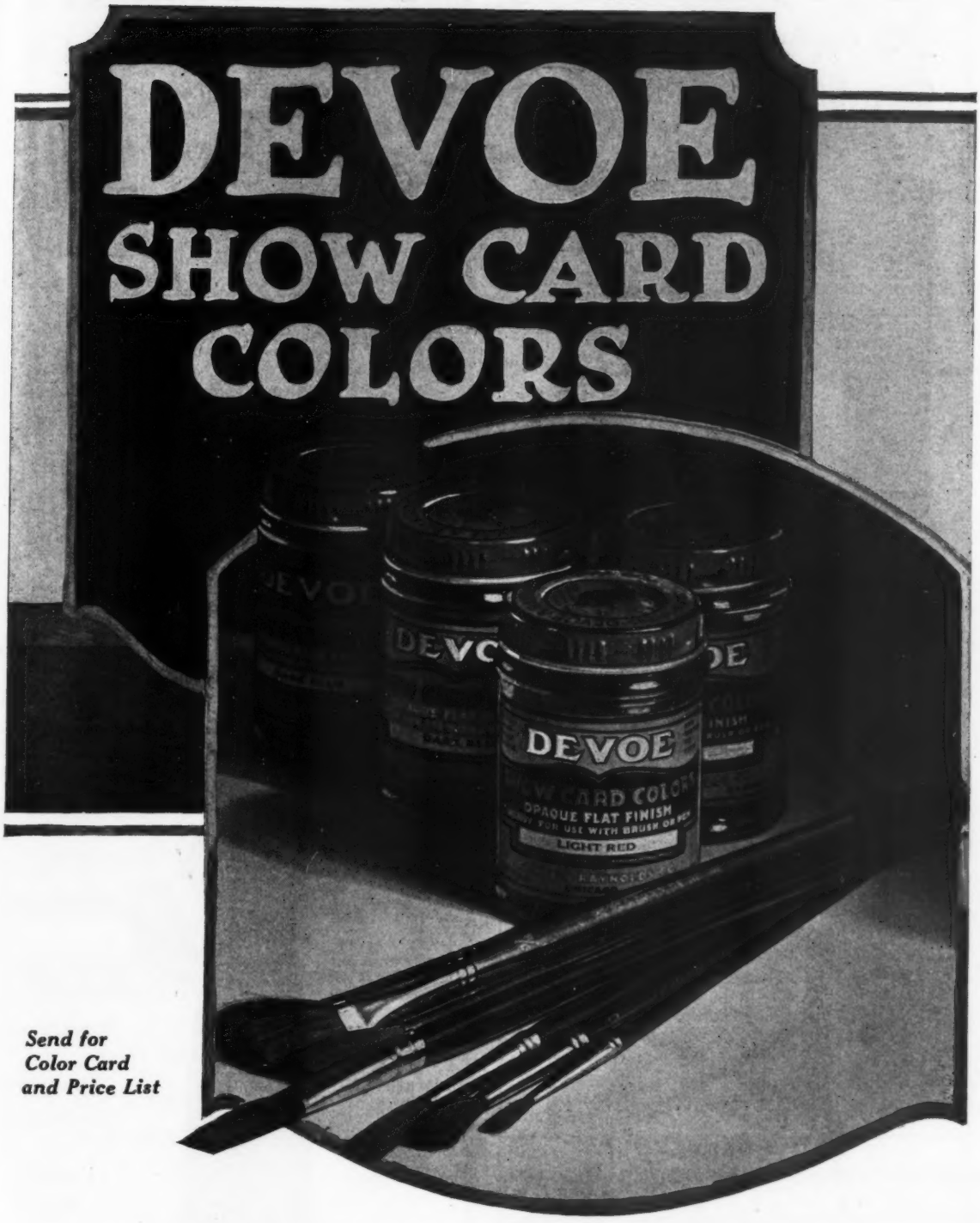

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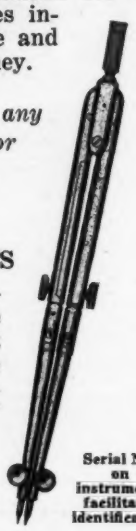

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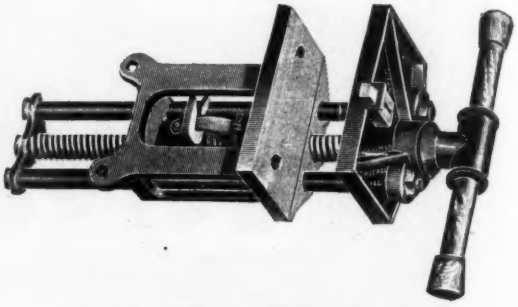

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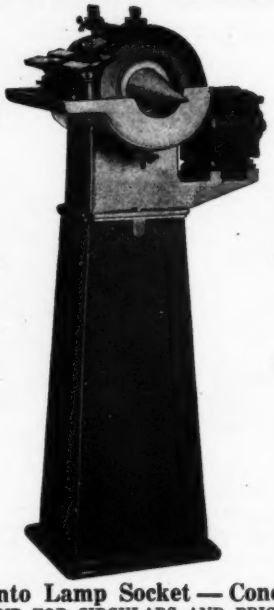

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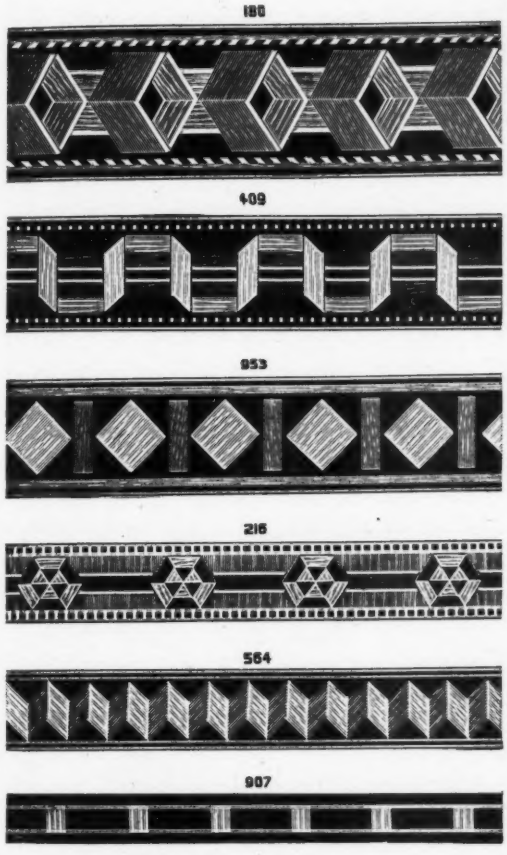

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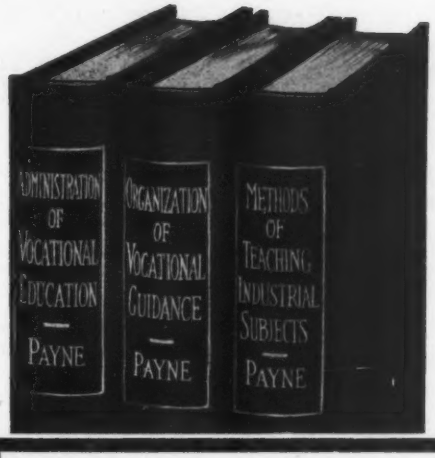

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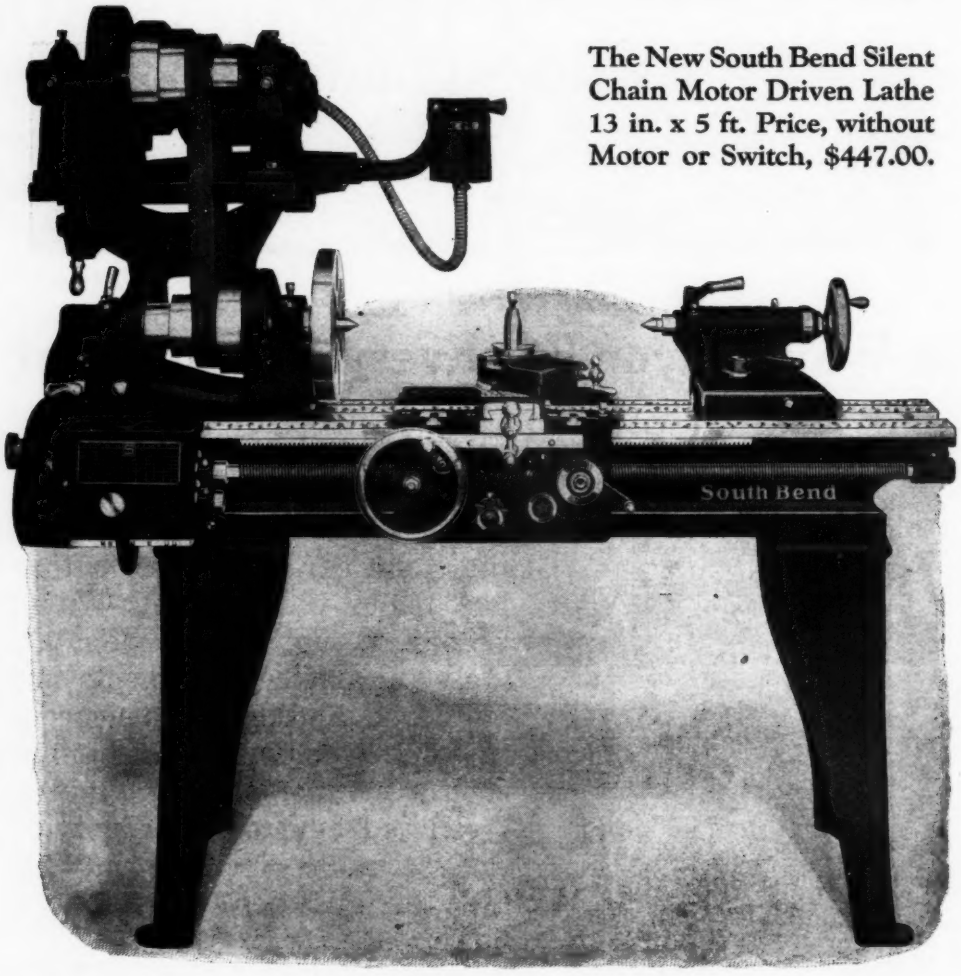

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Vol. XV
No. 9

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School and Shop Utilities

In this issue of the MAGAZINE appears a group of problems which, for lack of a better name, are designated "School and Shop Utilities."

Every school occasionally requires some bit of furniture or equipment which is out of the ordinary and which the board of education cannot be expected to furnish. If that utility is within the ability of the shop instructor to design and of the pupils to make, we see many reasons why it should be undertaken. Such a project may add variety and interest to the year's work; it may supply an annual "factory production" job, and it certainly will impress upon pupils the value and the close relationship of labor to the every day things required for living.

Need it be said that the educational value in the shop must be the first consideration in every school utility project? Certainly such a project should not interfere with the orderly, carefully planned course of the shop, or its objectives.

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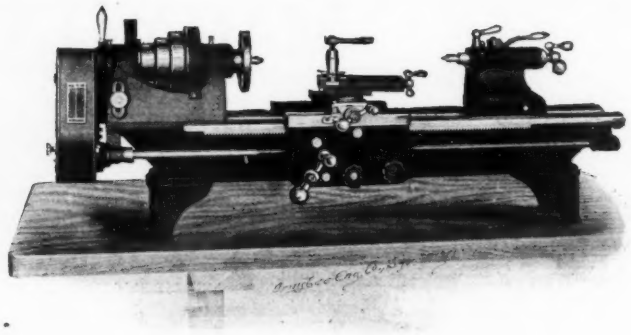
STAR LATHES

USED THE WORLD OVER



STAR LATHES

IN OVER 400 SCHOOLS

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Note the convenience of using the bench type lathe, plenty table space for work and tools, saving of floor space, storage space under the table and a drawer for tools, etc.

STAR LATHES

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10" Swing, 4 to 5 foot Bed
12" Swing, 4 to 7 foot Bed

FLOOR TYPE
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12" Swing, 4 to 7 foot Bed
14" Swing, 5 to 10 foot Bed

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THE INDUSTRIAL ARTS MAGAZINE

Volume XV SEPTEMBER, 1926 Number 9

Developments in Industrial Arts Education[1]

F. T. Struck, Director, Bureau of Vocational Education, Harrisburg, Pa.

Philadelphia the cradle of manual training movement. It has been just fifty years ago since there were exhibited, in the City of Philadelphia, examples of work in wood and iron made by the pupils at the Imperial Technical School at St. Petersburg. This exhibit, held in connection with the Centennial Exposition of 1876, proved of much interest. It was the beginning of the manual training movement in the United States. The first public manual training high schools were established in Baltimore in 1884, in Philadelphia in 1885, and in Omaha in 1886. Just ten years later than the Centennial Exposition in 1886, Mr. Gustave Larsson, introduced Swedish sloyd instruction into the public schools of Boston.

Why introduced. The demand for instruction in manual training came as a result, in part, of a modified philosophy of education, and partly because the general public desired a secondary education that was not wholly bookish. Manufacturers and others engaged in work involving skilled labor recognized the need for training that would in time develop skilled artisans. Others justified manual training on theoretical grounds. In fact so many claims were made that one would think that manual training was surely the panacea for all educational ills.

The transition. Time and experience have shown us a few outstanding things rather clearly. The old traditional manual training instruction placed too much emphasis upon the manual or physical aspects of the instruction and not enough upon the thought content or mental side; it placed too much emphasis upon training (which in the narrow sense of the word is habit formation) as distinguished from education which may be regarded as habit formation involving reasoning; there was too much of following instructions rather than providing for initiative on the part of the students.

So out of the early exercise work given in a very formal way has grown a new conception of the place and purpose of such instruction. And along with these changes has also come a new name—industrial arts education.

What is industrial arts education? The term "industrial arts" as applied to education stands first of all for instruction that is today recognized to be an essential part of general education. It is one of several forms of practical arts education—the form that concerns itself with education definitely related to those manifold practical activities of mankind that are distinctly industrial in character. Industral arts education precedes vocational education. It forms a necessary general foundation and back-ground upon which specialized vocational education may be built. In a sense it is one of the connecting links betweeen broad, general education on the one hand and narrower specialized vocational education on the other.

Industrial arts instruction is given in the elementary as well as in the junior high school field. When given in grades one to six inclusive, it is frequently referred to as elementary industrial arts. In these grades the instruction is usually handled by the regular classroom teachers.

In the more advanced grades, the instruction is usually given by teachers having considerable special training.

New Developments. Industrial arts education, like other movements in education such as kindergarten instruction, home economics education, and agricultural education, is a matter of gradual development. Progress frequently consists in improvement and refinements rather than anything distinctly new. Among recent developments in the field of industrial arts education may be mentioned the following:

1. Wider recognition of the need for industrial arts education.
2. Emphasis upon a diversified program.
3. Exploration and try-out.
4. The general shop.
5. The modified general shop.
6. Better unit shops.
7. Home mechanics.
8. Better trained teachers.

Each of these factors will be briefly discussed.

Wider Recognition. Industrial arts education has won recognition as an essential part of a good democratic program of general education through factors such as the following:

[1]Address before Department of Vocational Education and Practical Arts, N. E. A., at Philadelphia, June 29, 1926.

1. It appeals to, and satisfies certain strong inborn tendencies that are useful in education—such as the native impulses to want to construct and to decorate things—the constructive and artistic impulses.

2. It utilizes motor impulses and activities as a vehicle for carrying much useful information.

3. It helps to make possible learning through doing and it helps to balance the educational diet.

4. In grades seven, eight and nine it is particularly useful as a means of exploration and guidance.

5. It gives information about and experience with tools, materials, processes, and design that have wide application to every day living.

In speaking of the present scope of industrial arts education, I should like to limit myself to Pennsylvania, since recent statistics for the country as a whole were not readily available to me.

During the year ending June 30, 1926, there were enrolled in industrial arts courses in grades above the sixth, 135,000 boys in the public schools of the State. This required a small army of over 700 teachers—each specially trained. Over one hundred school districts in the State made provision for industrial arts education for grades seven, eight and nine. All of this is exclusive of 166,000 girls who receive similar instruction in the field of general home economics and about 4,000 farm boys and girls who are carrying on junior projects in connection with agricultural schools. And furthermore these figures, it should be noted, do not include enrollments in vocational courses of any kind—all are in the field of general education.

Diversified Program. The modern program of industrial arts education is broad. It deals with much more than woodwork and mechanical drawing for it aims, among other things, to give to pupils a broad appreciative understanding of what the world is doing in its major industrial activities. It aims to teach about such industries as the following: Lumbering, mining, iron and steel, printing, textiles, glass, paper and leather. Furthermore, it aims to touch the work of typical skilled trades such as those of the *machinist, electrician, printer, sheetmetal worker, carpenter, cabinet maker, pattern maker, plumber, cement worker,* and *painter* and *decorator.*

The aim of industrial arts education is, of course, not to develop highly specialized vocational workers—it is not to make mechanics. This cannot be done because the boys are too young, the time allowed is too short, and the equipment is usually not adequate for vocational education. But through work with a variety of tools and materials, supplemented by trips to industrial establishments and other observations and study, the boys can get information and experiences that will be very helpful at the time and in later life.

Exploration and Try-Out. By no means least among the advantages of industrial arts education are the opportunities that are afforded for exploration and try-out of pupils' interests and capacities in other than bookish lines. These try-out experiences are given, not in a hit and miss manner, but under the guidance of trained teachers who constantly study all students in order to help them to find out what vocations are likely to be the greatest sources of usefulness and happiness.

It is of course obvious that one cannot give try-out experiences in metal work without some metal working tools, nor in printing without some printing equipment. If try-out experiences are to be provided there must, somehow or other, be provided a diversified equipment.

The General Shop. When a school shop is equipped for two or more distinct types of shop instruction, such as woodwork and metal work, then the shop is called a general shop in order to distinguish it from the single activity or unit shop. A general shop, then, is essentially a composite shop. The term properly refers to a type of shop lay-out and organization—not as is sometimes thought to a distinct type of education. Industrial arts education is being given equally well in unit and in general shops. The instruction may be approximately the same in both cases.

General shop best for small schools. The general shop is particularly well suited to the smaller schools—to those that have only one teacher of industrial arts education, or that may have one only on a part-time basis. When there is a shortage of room; when costs of equipment and of operation must be kept down; and when the enrollment is small, then the general shop, or a modification of it, will best serve the need.

The modified general shop. When the size of the unit of administration is sufficiently large to employ two or three full-time industrial arts teachers, and assuming that it is desired to teach four or six forms of shop work, such as wood work, sheet metal work, electrical work, general metal work and printing on a general education basis, then a modified general shop is likely to prove very satisfactory.

A modified general shop organization may be arranged by having each teacher handle two or sometimes three distinct activities. For example, one teacher may give instruction in general wood work and electrical work, and the other one may handle sheet metal work and general metal work. Other combinations will suggest themselves—they will have to be worked out in most instances with specific teachers in mind for it is not always possible to secure teachers that have, to begin with, the necessary training to teach all combinations of shop activity that fall in line with a good paper lay-out.

The modified general shop is not necessarily limited in its application to the smaller school districts. Sometimes the location of the school with reference to the school population in certain grades is such that a city having approximately one hundred thousand inhabitants or more finds it expedient to establish general shops or modified general shops in certain schools, and unit shops in others.

Better Unit Shops. By a "unit shop" is meant a school shop that is equipped for teaching a single type

of education such as printing, woodworking, or electrical work.

In the unit shop plan of organization the teacher has the opportunity to become a specialist. This, other things being equal, is a distinct advantage to the pupils to be taught and is usually also desirable from a teacher's point of view. The unit shop plan of organization is very popular in schools having an enrollment sufficiently large to justify the establishment of a series of such shops through which the pupils may be rotated.

Unit shops have been established many years in the larger cities and their arrangement and equipments reflect considerable progress. Sometimes the equipment is planned so that the shops may be used for industrial arts students a part of the time and for vocational day or evening students the rest of the time. In any case, they frequently reflect careful planning so that the cost will be reasonable and so that the shops will be well suited to their purposes.

Home mechanics. A good approach to industrial arts shop work in the seventh grade may be made through home mechanics. It is much like approaching the study of civics through home and community civics. The seventh grade boy can well be ushered into the broad realm of industrial-arts education through instruction that first of all centers around his home and his everyday wants. From this point it can be broadened to become state, nation and world-wide in interests and appreciations. Through home mechanics the boy is brought in touch with projects involving a variety of tools and materials, and including both repair and construction work. It is an excellent thing to give a boy the opportunity to learn the "how" and "why" and "wherefore"of things that need to be made and repaired about the home, or in case of farm boys, around the farmstead, but his interest and appreciations must be broader than home activities, and his skills should be more representative of what people are doing in their occupational efforts. It is well to keep in mind, therefore, that home mechanics is but one of the introductory steps to industrial arts education.

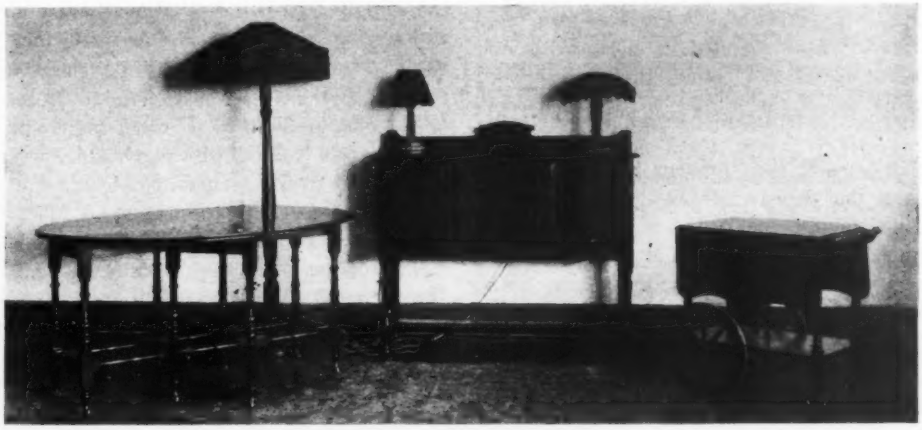
Better trained teachers. The last factor that I shall mention in the development in industrial-arts education, but by no means the least important is better trained teachers. In these days of ever increasing specialization it is not an easy matter to find persons who have had both adequate professional training and satisfactory experience in two or more types of practical arts work. And when found such teachers often command salaries beyond the range of the smaller school districts that need them most.

It is easiest to secure a teacher for a unit shop, somewhat harder to get one for a modified general shop, and still more difficult to get the right kind of a teacher for a general shop where two or more types of shop work are taught.

At the present time the greatest single handicap to the development, particularly of the general shop movement, is the shortage of properly qualified teachers. It would be a mistake to plan for one type of shop organization or another without at the same time looking into the availability of competent teachers. The success or failure of an enterprise frequently hinges upon how it is handled at the start.

There is no use in buying fairly extensive equipment for giving instruction in printing or sheet metal work, for example, unless the teacher can handle such activities. In other words, the available teacher must be considered in planning curricula and in equipping shops.

The standard of teaching is going up in industrial arts education as in other branches of education. A well qualified industrial arts teacher should be able to meet the professional requirements of other teachers in general education. In addition he should have had, or should secure while in service, practical trade training that will give him a rich back-ground of experience and knowledge that will be very useful. Technical training cannot entirely replace, even for industrial arts teachers the experience that comes from working at a skilled trade.



PROJECTS MADE BY A WOODWORKING CLASS IN THE MANUAL TRAINING DEPARTMENT OF THE NEBRASKA WESLEYAN UNIVERSITY TEACHERS' COLLEGE, UNIVERSITY PLACE, NEB.

The Veering Winds

(A Semicentennial Soliloquy)

Charles P. Coates, Los Angeles Schools

DURING the past two decades, thousands of travelers have read the inscription; but few have grasped its signification. It stands imbedded in stone over the doorway of an old storage warehouse near Union Station, in Saint Louis. Perhaps an obscure engineer turned the channel of secondary peculiar importance. Here with challenging boldness when this building has passed the stage of ruinous decay a bronze tablet will mark the spot, for it is one of education, out of its plain of erosion; here Calvin Woodward built the first manual training high school in the world.

What records and traditions of forgotten attempts to bring educated brains to the work-bench are conjured up by that inscription, "The Manual Training School." The very words came out of the past trailing clouds of vagueness and have undergone strange vicissitudes in their onward flight through the years. Undoubtedly Woodward combined them as a variant of an old and very familiar phrase with which he habitually associated ignominious failure. In his opinion the early "manual labor schools" which grew out of the exigencies of a rapidly expanding frontier failed because they did not afford students an opportunity of seeing and of attempting the best kinds of work.

Of course it was not at once that Woodward externalized his idea of a method of handicraft instruction in which this patent defect of the manual labor schools would be overcome; for the idea itself was not, by any means, a simple one. And when, in the early days, upstart scoffers pressed for a definition of manual training, he evasively answered that "if people will take the trouble to seek for the meaning not in the dictionary but in the organization of the school itself, its significance will be readily seen." Strange vicissitudes indeed! After 25 eventful years it was clear that his phrase had set its sails to the veering winds of educational doctrine. So surprisingly various in form were the substitutes for his unique method, fabricated behind sentimental shibboleths and pother, that he expressed regret that the use of the words had not been copyrighted.

When all is said, the "Russian System" manual training school that Woodward developed immediately after the Philadelphia Centennial of 1876 was well-nigh unique—unique in name, in aim, and in organization; never before was there one like it. Furthermore, many of us are persuaded, there will never be another.

Though it takes some courage to stand up for an old-fashioned school where, not infrequently, the incoming spirit of adolescent youth, aglow with wistful restlessness, made luminous with hope, was gassed by the alchemical fumes of Formal Discipline, yet those to whom the history of handicraft instruction is familiar know that there was another facet of this horrible picture—a facet which revealed a radiant tradition of hard, serious work. More than this, no crepuscular bats from the Freudian cave ever lurked around the huge chimney that stood behind the quaint demonstration forge; for the school was not a moron's paradise, "an asylum for dull and lazy boys." Inferiority complexes were unknown! Nor did pseudo-sympathetic guidance, the far-sighted knowledge of parental aspirations and of boyish whims, matter very much. Intelligence tests and individual differences? Well, for the time being these were in abeyance; still, later on, both found expression in what Woodward termed "the fruit of the tree"—the most glorious record of alumni achievement ever published by a secondary school.

Often, when I read this record of achievement, it occurs to me that we have sold our birthright for a mess of pottage; we are quick-change somnambulists in a waking dream. It occurs to me, too, that something worth while in the way of educational guidance and scientific management passed into history along with the old Pioneer Manual Training School and its abominable Russian joints. But perhaps this naïf train of thought is the logical outcome of an afternoon visit to a new-fangled shop—one of those rehabilitated affairs where the demonstration bench is piled with the dust of four semesters of neglect. Perhaps it was a letter in the morning mail that led me astray. You are familiar, no doubt, with the new-fangled shop, with its director ricocheting about as he nervously talks of "putting over" something or other, and with its slogan, "Order is what a graveyard ain't got nothin' else but."

Now it is useless to point out, except in passing, that this slogan is the heinous dross of pedagogical incompetence. We know all too well, however, that slogans are proverbially important and that this one is exceedingly high-powered. Dour days are ahead; for the veering winds that are ravaging the educational world have upheaved unwholesome, poisonous vapors.

Come, share part of a letter! A breath of the ozone-laden atmosphere in which the cradle of manual training was rocked will recrystallize your faltering faith in one of the outstanding objectives of handicraft instruction—teaching boys to think, deeply and logically. It was written by a man whose name stands forth prominently in the old Manual alumni roll and in the world roll of achievement. For he has harnessed the flood-tide of rivers and made the cactus-ridden deserts bloom. Not long ago, Arthur Morgan of Antioch College, told me that in his opinion Sherman Woodward was the greatest hydraulic student in America. Professor Sherman Woodward, whose faith stands weather-proofed against all the winds that blow, writes:

"I have often thought it a great pity that my uncle, Calvin Woodward, did not write his own biography before he died. I lived in his family for seven years, from 1886 to 1893, but I was rather young at that time, and, though I have vivid memories of the period, I suppose my impressions are rather one-sided and limited in outlook. As I remember him, my uncle was not much inclined to indulge in reminiscences of his early life.

"I would picture the situation during the Seventies and Eighties out of which the Manual Training School grew, as follows: Washington University, of which it was a department, was then a small, struggling institution always cramped for funds. The course of study was of the old required type with a limited amount of selection between courses. The engineering courses were being slowly developed and, on account of their popularity, were regarded by the classicists with much jealousy. There was at times great friction and rivalry between the engineering professors. Smith Academy, another department of Washington University, and the High School regarded the Manual as a rival, an interloper, a shallow charlatan. During the first decade of its existence, in spite of its popularity, the financial stability of the Manual was unassured, and even its continued existence uncertain; while it had many friends, they were, I think, very scarce among those engaged in educational work.

"Probably the pedagogical theory of manual training was not thought out, particularly at the beginning. But in considering this we must regard conditions as they were at the inauguration of the movement. The whole vocabulary of pedagogy and psychology has changed since that date. At that time laboratory teaching of science scarcely existed in high schools, and it was of very mediocre quality in colleges. Experimental psychology was unknown. * * * It is twenty-five years since I have had any particular contact with manual training, and I know but little of the details of present-day practice. But I have always retained a high regard for my uncle's kind of manual training. For it seems to me that it possesses very largely the characteristics and values of high school mathematics and laboratory science, and possesses advantages over all these. * * * I am sure that only a small fraction of boys of high school age can do well at that kind of manual training, but for that small fraction I think it very useful. It seems to me that it cultivates the scientific habit of mind better than any other kind of training of which I know. What should be done with that other large fraction who do not profit by this kind of training is a question for which I have no solution. Practically the same question confronts us in our college administration and, I am sorry to say, we seem to have found no acceptable solution.

"Now, when we consider that my uncle had a strictly classical education at Harvard, that by profession he was a mathematician and always carried a full load of college teaching, that in addition he was actively engaged in developing engineering education and acting as dean of the engineering college, that he could at the same time write the History of the St. Louis Bridge, organize and start the Manual Training School and act as its principal seems most remarkable indeed. He was never one to say much of his worries or difficulties, but I used to think that at times he felt tired and worn, perhaps even discouraged. His unfailing optimism and vitality, however, carried him through every trying situation. Still I cannot but think that he was cast in rather an heroic mold."

Oh, yes, Calvin Woodward WAS cast in an heroic mold, but the mold was blown and shaken and the sand riddled down in his grave.

How to Organize a Course of Study

Ammon Swope, Associate Professor of Industrial Education, Purdue University, Lafayette, Ind.

THE time of year is at hand when the new teacher must build a course of study or the old teacher revise one that he already has. If the course has never been put in writing, it is of great value to any teacher to find how hazy many of his ideas are until he attempts to set them down in good form. The neglect of this duty has often been the turning point in the career of an otherwise successful teacher.

The following proposals are submitted as the method of procedure which may be followed in most cases. The assumption is that the teacher has already formulated his aims for any given course, knows the length of the school year, knows what equipment will be available, something about the types of teaching that may be used, the relation of the course to other courses in the organization, as well as other local problems that may arise. The suggestions follow:

1. The subject matter that is to be presented in any given semester, year, or other unit of time should be set out in *major divisions*. These should be in sequential order. This order may be based as seems best on the logical or psychological divisions of the subject. In each case adaptability to the pupil must be kept in mind.

2. There should be a *time distribution* for the presentation of the subject which should indicate the extent of the work to be covered in the major divisions of the subject as well as in the smaller units extending to the smallest project or exercise. These time units should be suggestive only. Actual dates for the presentation may be given for any school year.

3. The *projects, jobs, or exercises* that form the basis of the work should be indicated. There should be two groups of these. First there should be a group that is required of all students in any given course. Second,

there should be a reward or merit group for those who complete the required projects in a shorter period of time.

4. In order to emphasize the value of production work there should be a *suggestive group* of types of work such as community projects, school projects, etc. These should in each case fit into the whole scheme of the course of study. It would seem advisable to allow in a course of study considerable flexibility because of the variety of work that may be found in different communities. The available equipment is also an important item to be taken into account here.

5. There should be provision in the course of study for arranging of the *related subject* work so that in case there is a possibility of correlation, the related subject teacher might with very little effort adapt his work to the shop course.

6. The best known method or *methods of presenting* the subject under discussion at any given time should be indicated in the course of study. That is to say, if an idea can be best presented by the use of a textbook, discussion, a job sheet, a demonstration, etc., or a combination of any of these methods, the suggestion should be made.

7. The *display of the course* of study should be attractive and easily understood by those who have only partial information in the subject being presented, such as supervisors, directors, students, etc.

8. There should be a limited amount of well chosen *reference material* displayed in the proper connections.

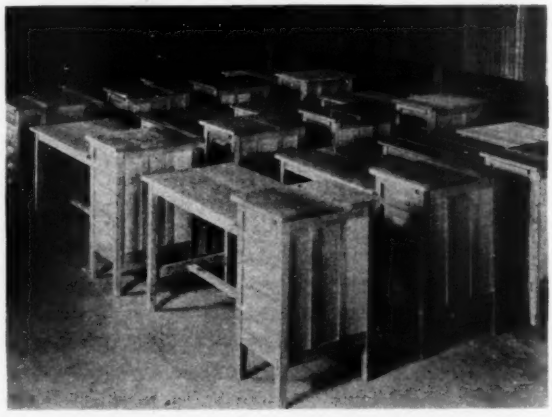
9. The course of study may be drawn up in two forms. First, the ordinary *manual or mimeographed form* may be used. Second, a *graphical tabular display* in which the major divisions of the subject are given on the left hand side in a vertical column and at the top such divisions head the vertical columns as (a) standard projects, jobs, etc.; (b) merit jobs, etc.; (c) production jobs; (d) time distribution; (e) methods of presentation; (f) related subjects data; (g) reference material. This would give a distribution of the courses of study in tabular form which could be displayed on a bulletin board so that student, teacher, supervisor, or any one concerned could in a few moments check the progress of any individual at any time.

10. It would seem advisable further to suggest the method of grading or rating pupils on the type of work involved.

The writer has received many criticisms from teachers on the above plan, some of which were criticisms of opinion from a cursory glance but others criticisms based on an actual attempt to follow such a preliminary draft. This latter group should be heard. In the first place, the plan is suggestive but is definite. There can be no question about most of the items entering into such a plan. The most severe attack has been made on item number two, time distribution. For the beginning teacher without any direction, it is almost impossible to estimate correctly the amount of time to be consumed by the average boy on a project. The teacher of experience should be able to make such an estimate with little difficulty as contractors do. It is advisable to set down actual dates each year rather than total amount of time to be consumed. This plan has a wholesome effect on supervision and directors as well as students. It often prevents an official from rushing in with what he thinks is an emergency job. His emergency jobs he will find are provided for by the plan in item number four. Many a teacher has worked half the night to "save his face" on such a job because he had no students who could handle the work. These jobs often present the best type of instructional material but the value is entirely lost because of the failure to provide for them in a definitely organized scheme. The time distribution difficulty is more apparent than real in most well organized courses. The suggestive group type of work offers a real problem because of the diplomatic problems involved. A partial answer is found in the following paragraph.

It is easy for a manual to hide itself in a drawer or under a stack of books, but charts are so cumbersome that they must be hung on the wall to get rid of them. And besides a well executed chart has a way of jumping at the passer-by so that even supervisors take notice of them. It is not to be doubted that a tabular display of a course will be noted by all concerned from supervisor to student. To the supervisor who is busy it is a guide post and the means of a quick survey of a shop, to the teacher it is an accurate guide book, while to the student it is the stimulus to continued travel with enough information to make the journey alluring. If the teacher has difficulty with impromptu jobs crowding into his shop at the wrong time, such a displayed table of his work will not only bring in the correct type of job but it will usually bring them in at the right time.

Let every teacher plan his course as carefully as his vacation trip was planned, taking into account the incidental things that may arise which can not be predicted but which add zest to his trip.



TYPEWRITER CABINETS OF OAK MADE BY STUDENTS AT THE STATE COLLEGE OF WASHINGTON, PULLMAN, WASH. MR. S. C. ROBERTS, INSTRUCTOR.

A Study of the Vocational Trends Among High School Students

H. W. Schmidt, Supervisor High Schools and Manual Arts, Department Public Instruction, Madison, Wis.

SOME years ago the writer began a study to determine, if possible, the general trend among high school students regarding their vocational desires and their attitudes towards their respective life's work. A considerable amount of data was collected and first appeared as a preliminary report[1] and later a partial summary was published in the Industrial-Arts Magazine.[2]

In brief, the manner of collecting information for this study (which was confined to the students of carefully selected Wisconsin high schools) was by means of having students fill in a small slip containing answers to the following questions:

1. Put down a capital "B" or "G" depending upon whether a boy or girl is filling out the slip.
2. In what grade are you now enrolled?
3. Put down your age to the nearest birthday.
4. Write down what you propose to do or what vocation you intend to follow or how you expect to earn your living after you have completed your education. . . . If you have nothing definite in mind at this time, do not fill in the blank space.
5. Answer the following question with "yes" or "no": Is there any one in your immediate family who is doing the same work that you have put down as your choice?

This material was tabulated and an analysis made of the results which were set forth in considerable detail in the magazine referred to. Some interesting results were obtained and these were summarized, at the time, in the following paragraphs:

1. The occupations chosen by high school students are not influenced to any extent by the character of the community in which students are going to school, with the possible exception of "farming."

2. With the exception of "farming" there is no evidence that "home influence" is an important factor in the choice of an occupation.

3. The relation existing between the number choosing an occupation and the number required by the state or the nation is nil. There is either a very large over-production or a very decided under-production. Even if it is granted that certain occupations are recruited largely from those not possessing a high school education, the discrepancy is greater than can be explained on the basis of modern trends which look towards a secondary school education as a minimum.

4. Eighty per cent of high school students choose an occupation, contrary to accepted notions that they do not know what they want to do.

5. The vocational trends appear to persist in a marked degree and not at all consistent with popular belief.

6. Vocational or educational guidance are not in evidence though much needed in the light of the study.

7. Special courses in high schools seems to influence the *distribution* of certain vocations among the four years of the high school but do not influence the *frequency* in the various schools. Those schools offering special courses do not exhibit any variation in occupational choice likely to be influenced by such courses from those schools which do not offer special work. Evidently the courses do not function as "finding courses."

8. Where marked variations from central tendencies occur, special investigation nearly always shows this due to the influence of a certain teacher, her work, special methods or superior or attractive equipment; sometimes it is also due to the "drive" of an enthusiastic personality.

9. Very large cities should be excluded from a study such as this covering a state-wide distribution and undertaken for generalized conclusions. They exhibit special and local problems, not, as a rule, comparable with those found in a given large population area, such as county or state.

For those interested, it might be stated that a study somewhat broader in scope was made at about the same time by book[3] and published in 1922 under the title of "Intelligence of High School Seniors." Certain chapters in this book will be of interest here.

Among the conclusions cited above there was one, number five, which it was felt at the time, was possibly not based upon sufficient investigation to warrant its continued assumption. It refers to the persistency of vocational trends among the individual students. The original material extended over a collective period of but one year and covered six of the larger schools. It was decided that a more extended period of time would be profitable and possibly give more adequate and reliable information, especially if the data covered a wider range of schools.

Additional material was gained therefore by getting data similar to that obtained in the first part of the study, but confining it to the senior classes of the various schools. In this way it was hoped to get information relating to the existence of definite trends among individuals, on the assumption that the senior classes of 1924 would contain a large percentage of those who were in these schools as freshmen in 1921.

The questions answered by the students were very similar to those stated in the beginning of this article, but in addition called for answers to the following:

Do you remember of having filled out a slip four years ago similar to the one now presented? If so answer "yes."

If you are filling in the same vocation you did four years ago, as you remember it, indicate this fact by the word "same."

[1] Ind. Ed. Circular No. 11, 1922, Bureau of Ed., Washington, D. C.
[2] June, 1922, page 215.
[3] Macmillan.

DISTRIBUTION TABLE FOR 12TH GRADE REPORTS

1		2 No. Rprtg. 1924	3 % of Total 1924	4 % of Total 1921	5 % of 12th Gr. 1921	6 % Rprtg. Same	7 Girls % Rprtg. Same	8 Boys % Rprtg. Same
A	Business Accounting, etc.	102	9.8	5.7	8.4	9.0	17.0	6.4
B	Stenographer, Clerk, etc.	193	18.5	17.8	16.9	20.7	20.1	30.0
C	Teacher	297	28.4	21.5	24.9	31.1	27.0	46.3
D	Nurse, etc.	77	7.6	4.6	4.8	23.0	23.0	0.0
E	Dressmaker, etc.	9	0.8	0.5	0.6	0.0	0.0	0.0
F	Arts and Music	34	3.1	3.4	3.7	52.9	62.5	30.1
G	Journalist, etc.	18	1.4	0.4	1.7	44.4	28.5	54.5
H	Engineering	103	9.8	7.6	9.0	37.8	0.0	37.8
I	Physician	28	2.6	2.2	3.8	17.8	0.4	17.6
J	Lawyer	26	2.5	1.7	2.2	30.0	0.1	30.0
K	Chemist, Druggist	12	1.1	0.9	0.8	16.6	0.0	16.6
L	Ministry, etc.	0	0.0	0.4	0.2	0.0	0.0	0.0
M	Mechanic, trades	32	4.0	3.6	2.2	6.2	0.0	6.2
N	Farmer, etc.	17	1.6	5.5	2.8	52.9	0.1	52.9
O	Miscellaneous	47	4.5	4.7	6.3	4.2	0.0	7.9
P	Do not know	37	3.6	18.1	11.4	19.8	20.1	17.5
	Total, 1032							

These slips and questions were sent to 24 schools. Returns were obtained from all of them, but four schools reported fragmentary data and three contained no reference to the above two questions; evidently a misunderstanding of directions. The authentic data obtained was tabulated and is given below.

The tabulation of "hold-over" data in the magazine article referred to previously shows a rather marked parallelism in the percentage of the various vocations as given during 1920 and 1921, but it would appear that . . . " the number of replies are . . . not large enough nor the schools numerous enough to warrant a didactic statement that vocational trends *do carry over and stay with* students for a number of years . . . A more definite answer might be given if the investigation could be carried on." . . .

In the light of the above the table of data should prove interesting and instructive. It will be noted that the seventeen schools sent in 1032 slips distributed over sixteen items or groups of vocations. The number of students reporting is shown in column two. Column three shows the percentage distribution of vocations among all of the seniors of 1924, while column four shows the percentage distribution for the total number of replies (8120) received in 1921. Column five shows the results of replies received for the seniors of 1921 in the same schools as those of 1924. The distribution of trends in these three columns is very similar and with the exception of a few minor differences is virtually constant. There appears to be less hesitancy in choosing a vocation as shown by line "P" and a slightly greater tendency among seniors to become mechanics, "M". A slight increase (3.5%) in "teacher," "C", is compensated for by a decrease (1.8%) in miscellaneous, "O". It is quite evident that as a whole no shift in the general trends has taken place in the last four or five years and that "the relation existing between the number choosing an occupation and the number required by the state or nation is (still) nil . . . even if it is granted that certain occupations are recruited largely from those who do not possess a high school education, the discrepancy is greater than can be explained on this basis."

It is evident that we still have a long way to go in the direction of vocational and possibly educational guidance if these are to have a significant influence in the matter of relating supply to demand, and if it is to be conceded that this is one of their functions. We still need nearly 57% of "hand toilers" out of every 100 persons engaged in "useful occupations."[4] Unless high school seniors change their attitude, we are evidently not going to recruit many of these 57% from among high school graduates. Fortunately compensations and adjustment will influence the situation markedly and we will no doubt not be in a very bad plight after all.

The most interesting feature of the investigation is contained in column six. This gives the percentage of pupils who indicated the same vocation over a period of not less than four years. In other words those whose minds are evidently made up as regards their life's work. It is of course not said that this desire will endure, but it certainly is more likely to than among those who shift their attitudes from year to year. Of the total replies received (1,032) 69.2% or 714 had answered the questions in 1921, and 25.2% or 310 answered the same in 1924. As the total number who had answered before is 714, it follows that of those who answered in 1921, 43.4% answered the same in 1924. Nearly one-half of the students remained loyal to their first choice—a much higher percentage than was anticipated.

A brief glance at column six will show that with the exception of "M," farmer, the professions, if we include the fine arts, seem to have the greatest hold on the students as regards constancy. Evidently "ministers" and "dressmakers" are in a bad way here. The fine arts, journalists, and engineers are the favored ones with 52.9%, 44.4% and 37.8% respectively, while the mechanic is a bad loser with 6.2%.

Columns seven and eight show the results between the two sexes. Lines A, B, C, F, G, and P seem to cover subjects which are comparable. Business and fine arts seem subjects in which the girls appear less fickle than boys, while clerks, teachers, and journalist seem to have a stronger holding power over the boys. Those who do not know appear to be about evenly divided.

[4]U. S. Census Reports, 1920, U. S. Dept. of Commerce.

It appears therefore that the original conclusion arrived at five years ago has a greater validity than was assumed at the time, i. e., that definite individual vocational trends or desires do carry over during the high school period of four years to a real extent, whatever their fate may be later.

The range of coincidence is more markedly confined to the professional subjects, among both boys and girls, with the exception of "farmer." The latter, as explained in a previous article,[2] is probably chargeable to "home influence" which seemed to be exhibited in this direction very definitely.

It also appears very evident that the distribution of the larger vocational groupings are quite constant, at least over the period of years covered by this study. One might essay to state that the war influences were still quite strong during the school year ending in 1921 and that therefore certain types of vocations would be influenced thereby. But the results of columns three and five are so nearly the same that this statement appears to be without foundation or at least is not tenable. Whether the influence of the schools through their generally accepted conservatism is responsible for this tendency in uniformity, whether it is due to a real feeling of desire on the part of the students or whether influences outside of the school are responsible, is of course a question which cannot be answered here.

If we are to concede any great validity to the data collected then the following conclusions may be cited:

1. The extent of vocational trends among high school students is fairly constant from year to year.

2. The professional groups of vocations are more in evidence among high school seniors than other groups.

3. Individual vocational trends seem to carry over for a four-year period at least and with the exception of "fine arts" and "farmer" are confined essentially to the professions.

4. Among girls the peak of carrying-over seems to be reached in the fine arts; among boys journalism is closely followed by farming.

5. Nearly fifty per cent of high school seniors seem to have carried over the same vocational desires from year to year.

Little Arguments on Great Principles

S. O. S.

Paris, France, July 24, 1926.

O. K. TrySquare,
Mechanicsburg,
Efficiency Co.,
State of Education, U. S. A.

My Dear Friend and Colleague:

Here I am at the well-spring of aesthetical creation, drinking in the inspiration of the old masters.

This summer I have satisfied a long felt desire to wander through sunny France and Italy, mingling with the congenial Latins and breathing the atmosphere of the Renaissance with care free Giotto, pious Fra Angelico, poetical Botticelli and the romantic Venetians.

One aesthetical delight after another has so entranced me that I have quite neglected financial matters as usual.

These foreigners seem to think I am a wandering Santa Claus with a perpetual supply of lira and francs.

They refuse to recognize me as a poor American teacher of art and hail me as Croesus.

I can see the price of things go up as I approach.

My penny pocket is worn to a Bohemian frazzle.

Please forward without delay, that two hundred dollars left of my last year's salary and if you could add another hundred to it by way of investment for yourself in the rare artistic bargains I am finding here, I could secure you a guaranteed original sketch by that left-handed, eccentric genius Leonardo.

You will recall Leonardo as a great engineer and scientist as well as artist. He invented mechanical things as well as Mona Lisas and we have his own word for it that he could do anything as well as any man.

How I wish that you was with me Monsieur TrySquare!

How I wish that you were with me Monsieur Try- the Uffizi and the Pitti and the Louvre, drinking in the beauty of the Golden Age and occasionally taking a sip of other Italian or French vintage.

Most sincerely your impoverished friend,

Ludovici Anatole Frills,
123 Boulevard Mont Parnasse,
Paris, France.

Mr. TrySquare's Reply

Mechanicsburg, Efficiency Co.,
State of Education, U. S. A.,
Aug. 5, 1926.

Dear Frills:

Have wired $250.00 to American Express Company, Paris, France.

I do not wish to invest in art unless you can submit prices F. O. B. Mechanicsburg and send goods on approval.

Faithfully yours,

O. K. TrySquare.

Accident Prevention in the Manual Training Shop

James K. Shallenberger

Fourth Article

THE BAND SAW

1. Have you read the catalog description?
2. For what type of work is this machine designed?
3. How is the machine started and stopped?
4. Where is the machine oiled?
5. What is the capacity of the machine? The answer should show the maximum thickness and width that will clear the guide above and the saw blade on the left. It should also show some judgment in the advisability of ever using the saw to this maximum capacity.
6. What precautions should be taken before the machine is started? It should be impressed upon the student that while the list seems rather long the whole of them can be taken in at a glance.

a. The belt is not fouled with scrap.
b. The throat is not fouled.
c. The saw is in its guide.
d. The table is clear of tools and scraps. In this regard a counter brush should always be available at the machine.
e. There may be some local matter due to location of machine or its relation to other machines on the line shaft, which should be added.
f. See that standing room at saw is clear.
g. See that the guide has been set so that it will just clear the stock.

7. What are the abuses of this machine?

a. The cut must not be started until saw has picked up speed.
b. Operating with tools on saw table which may be knocked off into belt or saw.
c. Forcing saw on curves too sharp for width of saw.
d. Forcing saw with too heavy cut or too fast a feed.
e. Backing out of long cuts while saw is running.
f. Putting too much tension on saw.

A rule of thumb method suggested to the author by the J. A. Fay & Eagan Co. is as follows: Draw up the tension so that saw is just free from sag. Add to this about one-half turn of the tension adjustment screw.

g. Attempting to tilt table or make any adjustments while the saw is running.
h. Nails in stock.

8. What is lead?
9. How is the saw mounted?

It is not necessary to have the boy demonstrate if he explains the methods and makes clear all the adjustments necessary, and speaks of turning it over by hand to test its running true and clear.

10. How is the saw coiled for storage?
11. Where are the following parts and what is the purpose of each and how is each adjusted?

Tension head.
Leveling device for upper saw pulley.
Mechanism for tilting table.
Saw guides, both upper and lower.

12. What are the dangers to the operator in using this machine?

a. Anything that will tend to slip saw from wheel. This includes backing out of long cuts, too much tension, tools on table that will foul saw at left, or cannot be supported or turned easily by one operator.
b. Anything that will tend to break saw. This includes forcing dull saw, resawing boards held on edge but without side support to keep from rolling.
c. Sawing pieces which are round or under-cut which are likely to roll under and throw the hand into the saw.
d. Clearing scraps away from saw with fingers or brush. A stick should be used.
e. Attempting to adjust the height of guide while the machine is in operation. For this reason the habit should be formed of adjusting the machine as indicated under Question 6-g.
f. Reaching around on the outside to control stock or pull stock through. The left hand should always be used because if the saw breaks it tends to fly "out" instead of "in."
g. Attempting to reach too far back of saw, thus bringing face and head in too close proximity of saw. This is frequently done by boys, too intent on keeping a piece from falling, to notice the dangerous position of the head.
h. Attempting to saw pieces too small, thus putting the fingers dangerously close to saw. This includes feeding the last bit with fingers instead of a push stick when the piece is narrow.
i. Watching an operator from the right side of the table. If the saw breaks he is in direct line of its whip away from the wheel.

13. Demonstrate.

The demonstration should be made on a scrap large enough to make a straight cut of twelve inches and a fairly sharp turn. Notice should be taken that precautions under Question 6 are observed.

THE LATHE

1. Have you read the catalog description?
2. How is the machine started and stopped?
3. Where is it oiled?
4. What is the capacity?
5. What precautions should be taken before starting machine?

a. Turn over machine by hand and see that stock clears tool rest, etc.
b. See that tail stock is clamped tight.
c. See that pressure on centers is not too great to stall machine.
d. See that drive is in low speed.

6. What are the abuses of the machine?

a. Mounting stock by pounding piece on spur in head stock. The live center should always be set before mounting.
b. Using a hammer to set live center. Wood, copper or lead mallet should be used to avoid mashing down end of spur.
c. Failure to oil tail stock center, causing overheating.

7. How is speed controlled?
8. How is the tool rest and tail stock regulated?
9. What should always be done before shutting off the power? Throw the drive out of gear.
10. What are the dangers to the stock in operation of the machine?

a. Too high speed before piece is roughed to round.
b. Attempting to adjust tool rest while machine is in operation.
c. Screws set in face plate should when possible be so arranged that there is no danger of striking them with the tool or cutting away their support in the waste.

11. What are the dangers in operating this machine?

a. Neckties. Four-in-hand ties should be taken off or tucked in so there can be no chance of their hanging down. This is one of the surest means of serious accidents on the lathe and should be made very clear by demonstration.

Loose sleeves. They should be rolled to elbow. The dangers are the same as under Neckties.

b. Piece loose on centers or failure to clamp tail stock, so material can fly out.
c. Attempting to use any tools not intended for lathe work. The most frequent violation is the use of files, especially without handles, so that the tang may be forced into the palm of the hand. A boy sometimes attempts to use a divider in face plate work while the machine is running. It generally results in its being jerked out of his hand, with consequent chance for injury.

d. Mounting stock on centers, using the side grain to the centers. Only end grain should be mounted on centers. If it is necessary to use side grain, then a face plate or cup should be used in head stock.

e. The roughing cut should always be started at the left and worked toward the head in short bites. If the roughing cut is started from the right, long splinters may be torn loose that will fly in the operator's face or hands.

f. Glued-up stock or parted stock, as is commonly used in pattern making, should be roughed out carefully and frequently inspected for strain.

g. Danger to clothes in applying varnish, shellac, etc., to rotating stock.

h. Parting heavy stock. In parting heavy stock there is always a tendency to cut to the breaking point, thus throwing a heavy piece from the lathe.

i. Shifting the belt with the hands. This is especially dangerous if the belt is laced either with leather or metallic laces. Lathe belts should always be glued.

j. Polishing. When polishing is done on spindle work the rag used should be short. With long rags there is always a tendency to wrap the surplus about the hand, which is dangerous if the rag sticks or fouls. There is also a danger of heating the piece enough to start the glue. This is especially true in thin pieces on face plate work, such as nut bowls and the like.

12. Demonstrate.

Ask the student to mount a piece of stock 2"x2"x12" and turn down to round.

THE TOOL GRINDER

1. Have you read the catalog description?

This set of questions is based on a widely used oilstone grinder. Modifications, of course, must be made for the simple emery head type or the power driven sandstone water washed type.

2. For what type of work are each of the stones intended?

3. How is the machine started and stopped?

4. What are the abuses of this machine?

a. Using any of the wheels to grind down soft metals; brass, babbit, etc.

b. Grinding grooves in the stones.

c. Using the oilstones dry. Explain that it is not overheating a tool that is objectionable but the filling of the pores of the stone so that it glazes.

d. Using the edge of the stone to grind shoulders in pieces of metal. This rounds off the stone so that it needs frequent redressing.

5. How much oil should be allowed to drip on the wheel? The answer should indicate understanding that if too much oil is fed to the stone it flies on clothes and floor.

6. What are the dangers of using the machine?

a. Four-in-hand ties, as described under Lathe, 11-a.

b. Emery burns. These are the result of pressing the stock too hard against the wheel in an effort to get quick results. A slip generally means a nail ground off or a knuckle laid open.

c. If too much pressure is put on the face of the thin high speed emery there is danger of strain and a broken wheel. Emery wheels are very dangerous if broken while running at high speed.

7. Demonstrate.

Demonstration of this machine may be omitted unless it is desired to instruct in the grinding of tools. Whether this is done is dependent upon the time available. It is not necessary from a safety standpoint.

(To Be Continued)

A NOTE AND A CORRECTION

Since the article "Accident Prevention in the School Shop" has appeared, there has come to the writer a criticism from a layman which has led him to submit it to the criticism of a physician. The consensus of opinion of three medical men seems to be that, while there was nothing vicious in the paragraph anent the medicine chest, late practice in first aid differs sufficiently from that given to make it worth while to submit an alternative list for those who prefer not to use the one given.

First it is worth while to correct the sentence appearing on page 192 of the Industrial Arts Magazine which reads: "The class should be encouraged its use—, etc." It should read: "The class should be enjoined its use—, etc." This puts quite a different construction on what follows.

In the following I quote freely from a letter by Dr. Hugh Grant Rowell of Teachers College, Columbia University: "Bichloride, in any way it would be used as a single first aid dressing, on a skinned arm would not cause mercurial poisoning. It might irritate the skin which is already in bad shape and as you know bichloride does congulate protein. Used in proper strength, I should have no fear of it. However careless persons have used improper strengths and have left it around carelessly in solution and in tablets, so we have a little phobia in regard to it." Zonite in one-fourth strength would be the substitute for bichloride.

Mercurochrome in strength indicated by the manufacturers is being used instead of iodine because it is less painful and less irritating to bruised tissue.

The laudanum and subacetate was recommended to me by one doctor but others object inasmuch as it comes under the Harrison law. One doctor recommends alcohol at half strength, another suggests a salt solution (a teaspoon in a glass of boiled water).

Dr. Rowell's comment on brushes follows: "Camel hair brushes are better than swabs. This would be true if the swab was not prepared and ready, as an individual giving first aid would have only fairly clean hands. Swabs, however, are individual. A brush never is. I much prefer individual swabs—nevertheless the use of brushes will continue. cf Red Cross First Aid manual 3rd edition."

Original List	Alternate List
Mercury Bichloride	Zonite one-fourth solution
Iodine tincture	Mercurochrome
Laudanum lead sub-acetate	Salt solution or one-half strength alcohol
Quill camel hair brushes	Cotton swabs

The material in the original article was based upon several years' experience in the shop and had the approval of a mine accident surgeon, nevertheless since most first aid must be given by a layman, it were better that the individual instructor consult his local physician and get expert sanction in his chest equipment.

—J. K. Shallenberger.

The Report Sheet as an Aid in Teaching Automotive Repair

H. W. Paine, Milwaukee, Wis.

Automotive repair is an extremely difficult subject to teach successfully, which fact numberless instructors have discovered much to their sorrow. It is not difficult to tell where to begin nor is it hard to lay out a systematic, comprehensive, and sequential course of instruction, but it is decidedly difficult to present and teach this work in such a manner that the pupil is assimilating all of it as he progresses through the course without too much useless repetition.

Too often the instructor finds that the pupil has entirely failed to grasp some important unit of information or theory that had been presented in a lecture or a demonstration which the instructor felt at the time had been a masterpiece of "pedagogical technique." Why this failure on the part of the pupil? The instructor had many things in his favor. First, the pupil was interested from the beginning, just as everybody is interested in an automobile at the present time, and any part or piece from a spindle bolt to a spark plug is almost sure to get a response. Yet, with this in his favor, that particular instruction unit had failed. Why?

In order to determine the reason for this, let us consider the automobile as a whole. In its thirty short years of existence, it has changed from a crude horseless carriage to a wonderfully reliable and complicated piece of machinery to which almost every science has contributed something important. Right here is the greatest difficulty facing the instructor: the instruction work must cover a field as broad as mechanics and electricity themselves. This necessitates his giving the students information on hundreds of different theories and functions of parts, besides teaching them a high degree of

mechanical skill. The excellence of this skill depends upon the object of the course.

It is small wonder, then, that the pupil does not assimilate all that is presented to him. Before he has made the information decidedly his own, something else has come along and blotted it out. He may have grasped the idea at the time it was given, but failed to retain it because it had been cut into and practically obliterated like a freshly-poured concrete road upon which traffic was allowed too soon.

Obviously, any method that will help "set" the ideas as they are presented will be a great help. We must keep the other "traffic" off until our student has made this particular unit his own. There are numerous ways of doing this. One is by frequent reviews and tests. This method is enjoyed neither by the instructor nor the pupils and is a time-worn and uninteresting device that is beginning to lose its value for many, though undoubtedly it has its proper place.

Another method is by attaching "what questions" to information sheets and "why questions" to job sheets. Both of these devices are undoubtedly excellent. Another method, and, in the opinion of the writer, one of the best instructional devices at hand, is to supplement the information and job sheets with a third one known as a "report" sheet. This report sheet has been used extensively in physics and chemistry classes, and it gives most satisfactory results in "setting" the information in the pupil's mind in automotive work.

These blanks can be made to cover almost every conceivable piece of work encountered in the course. A few samples chosen at random are shown. They should be so designed as to make the pupil use the knowledge gained in lectures, demonstrations, or information sheets in filling them out. For example, in using the transmission blank reports, the students find it absolutely necessary to know the names of the different gears as well as their functions in the transmission. If this has become hazy, they will refer to their note-books or information sheets and get it in mind at once.

To figure the gear ratios, they must know the arrangement of the different gears on the various speeds. They will lay them out on the bench in the order in which they drive and by the time they are through with the sheet, they will have a conception of the transmission and its functions that will stay with them.

The steering-gear report for the worm type steering-gear calls attention to the location of the spark and throttle levers and to the condition of the various parts as well as to the other information regarding gear ratio. Attention is also directed to the methods of steering gear adjustments and to the method of locking adjustments. The object is to impress the important features on the student's mind while he is working on the parts involved.

In the engine report, an effort is made to call attention to the outside differences in various makes of engines and an opportunity is given to the pupil to make practical use of his arithmetic. Much interest can be aroused in the piston displacement calculations if the instructor will mention that this sort of work is often done by technical committees of different racing organizations. Our automobile mechanics classes developed a sudden respect for their mathematics and thoroughly realized their own deficiencies as soon as they encountered this sheet. I am convinced this change in attitude was felt in the whole school organization.

The report sheet is not intended to replace information and instruction sheets, but is merely an additional teaching device to aid the pupil in assimilating the subject matter of the course. It might be called a "fixing bath" of instruction.

The writer is entirely aware of the opposition by some educators to what might be called "mechanical teaching" by the use of information and instruction sheets, but the present problem of having to handle academic-size classes in vocational work must be solved in a practical manner instead of merely a theoretical one. This necessitates the instructor's adopting some workable plan that will bring the desired results. Thus far experience has taught that in handling such large classes, the information and instruction sheets are valuable and that the report sheets are further valuable in fixing the subject matter in the minds of the pupils in a most expeditious and satisfactory manner.

Boys' Technical High School **Automotive Department**

Steering Gear Report

1. Type of Steering Gear.....
2. Location of Spark and Throttle Levers.....
3. Gear Data
   - a. No. of Teeth on Worm Wheel.....
   - b. No. of Leads on Worm.....
   - c. .....
   - d. .....
   - e. Gear Ratio.....
4. Condition of Steering Gear:
   - a. Cross shaft bushings.....
   - b. Steering post bushings.....
   - c. Worm Wheel .....
   - d. Worm .....
   - e. .....
   - f. .....
5. Steering Gear adjustments:
   - a. How is gear tooth clearance adjusted?
   - b. How is end slack removed from the cross shaft?
   - c. How is end slack removed from Worm?
   - d. How are steering gear adjustments locked?

Boys' Technical High School **Automotive Department**

Engine Report

Engine No.....Make of.....Name of Car.....
Type of Engine.....
2. No. of Cylinders.....
3. Bore..... Stroke.....
4. Piston Displacement.....
5. S. A. E. horse power rating.....
6. Manufacturer's rating.....
7. Size of Valves.....
8. Lift of Valves.....
9. Angle of Valves.....
10. Method of Attaching Head.....
11. Location of Exhaust Manifold.....
12. Location of Intake Manifold.....
13. Location of Carburetor..... Make.....
14. Location of Water Pump.....
15. Location of Generator..... Make.....
16. Generator Drive.....
17. Location of Starter..... Make.....

Boys' Technical High School **Automotive Department**

Transmission Report

1. Transmission number .....
2. Type of Gear Shift.....
3. Type of Main Shaft.....
4. Gear Data:
   - a. Clutch gear—Number of teeth.....
   - b. Counter shaft drive gear.....
   - c. Counter shaft intermediate gear.....
   - d. Counter shaft low gear.....
   - e. Counter shaft reverse gear.....
   - f. Reverse idler gears (1)..... (2).....
   - g. Intermediate and high sliding gear.....
   - h. Low and reverse sliding gear.....
5. Calculated Gear Pitch.....
6. Gear Ratio on Low.....
7. Gear Ratio on Intermediate.....
8. Gear Ratio on Reverse.....
9. Condition of Transmission:
   - a. Bearings .....
   - b. Gears .....
   - c. Shafts .....

Remarks:

Signed.....

CAPACITY FOR SUSTAINED ATTENTION

We need to get the mastery of our brains and of our minds so that they become working instruments which we control. In education will must master mind. For example, your first attempts at penmanship were slow and painful and wearisome to body and mind, but after a while you wrote without conscious effort. A mechanic is a clumsy fellow when he begins his apprenticeship, but before long his fingers become supple and deft and serve his will without his thinking. Reading and the reading habit tax one's purpose mightily, but soon the printed page is taken in at a glance, and the reading habit, once formed, is a joy forever.—*Wallace Buttrick, Chairman, General Education Board.*

25 School and Shop Utilities Made in School[1]

SCHOOL BULLETIN BOARDS

Margaret Fullerton

How to make an attractive display of official notices and of announcements covering the various activities of the student body is a problem which must be solved wherever there is a school organization.

The main hall of the administration building of a school is usually the repository for a collection of tablets, pictures, busts, and athletic trophies, showing the students' love for their school and their desire to make it a beautiful place. Too often, however, the vista is marred by an array of bulletin boards, arranged according to luck, or according to the passing fancy of a dozen different publicity committees. The result is that the otherwise dignified halls are an untidy chaos of posters screaming their messages amid the surrounding typewritten examination schedules, club programs, and lost and found notices. Consequently neither the announcements nor the interesting and inspiring permanent exhibits, to say nothing of the beauty of the building, have a chance to be seen or appreciated.

Fortunate indeed are those schools where some pioneer official has recognized the importance of both student and official bulletins and visualized the potential beauty and order inherent in some plan which insured bringing such notices before the public in an efficient and dignified way while conforming to the building's architecture and the general scheme of interior decoration.

Those schools with, as yet, no organized or unified plan have an interesting problem which can sometimes be handled by classes in hand-crafts or shop work. Its successful solution will add materially to the attractiveness of the building and to the efficiency of the school organization.

The simplest, as well as one of the most practical, bulletin boards for general school use is a large board divided into sections allotted to the use of the various groups using it.

An example of this type is seen in Figure I, a sketch of a notice board in an English school and taken from an English school journal. It is designed to accommodate the announcements of four rival "houses" of the Darrel Road Council School, and is constructed from an old blackboard covered with billiard table cloth. Oak is used for the shields and pediments. The crests of the historic houses from whom they took their names head the spaces allotted each division of the school and have been modeled in plasticine, cast in plaster and then in lead, bronzed and enameled.

The construction of similar bulletin boards of this type may range from the plainest framed beaver board to the most elaborate and artistic displays which time and ingenuity can devise. Such a bulletin board may be

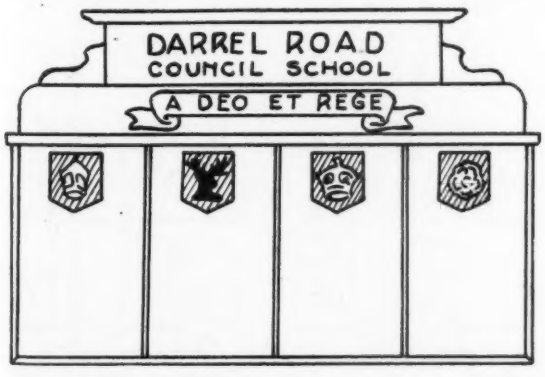


FIGURE I.

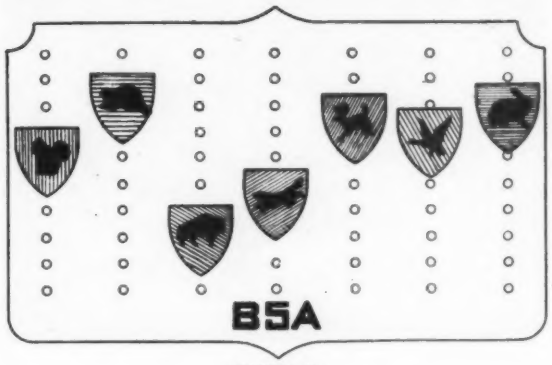


FIGURE II.

divided so as to cover practically all the needs of a moderate size school under general headings, as Official, Classes, Entertainments, Societies, and Athletics. Or it serves admirably to post the notices of several groups which come under one main organization: the different divisions of a School Activity Board; the several branches of an Athletic Association; the separate classes in either a grade or high school; or a number of school clubs. In such cases the name of the school or of the governing organization is used across the top, and the names or insignia of the several divisions at the top of the separate panels. With school classes, a permanent list of the class officers and standing committees may fill the space taken by the shields in the illustration. In grade schools, where much pride is taken in hand work, interest may be aroused by having the best example of work from each room posted from time to time as the decorative motif for each grade. When the panels are allotted to clubs, the official pin or the club motto makes a fitting decoration.

Figure II illustrates another type of bulletin board, that designed to show in a graphic manner the standing of units engaged in a contest. This particular board is devoted to recording the varying success attending the efforts of the seven "patrols" of a boy scout organization to win the greatest number of merit badges. The movable shields, bearing respectively the insignia, in their official colors, of the Squirrel, Beaver, Bison, Wolf, Deer, Duck, and Rabbit patrols, have short dowel pins in their backs which fit into holes of corresponding size in the face of the bulletin board. The contest started when all seven patrols were first organized. At that time no merit badges had been awarded. The pins in all the shields were, accordingly, placed in the lowest holes. When every member of a patrol has attained the highest possible scouting honor by becoming an "Eagle Scout," the shield bearing that patrol's insignia will stand at the top of the bulletin board.

The adaptation of this idea offers an attractive method of posting the records in any school competition. It may serve to keep scores in class athletic or scholastic contests. A permanent board, either plain or decorated with the school motto or monogram, may be used for many successive contests, it being necessary to change only the insignia of the movable shields.

One of the minor colleges of the West has adopted a system of bulletin boards somewhat more elaborate than either of the two already described, but worked out with such care that it makes an unusually attractive addition to their main hall. Each school organization has its own display board, decorated according to its own tastes but conforming to certain general requirements and hung in one wing of the hall at nicely spaced distances. Each bulletin board consists of a showcase about four inches deep, sixteen by twenty inches square, and with a narrow

[1]See Announcement on Page 25a.

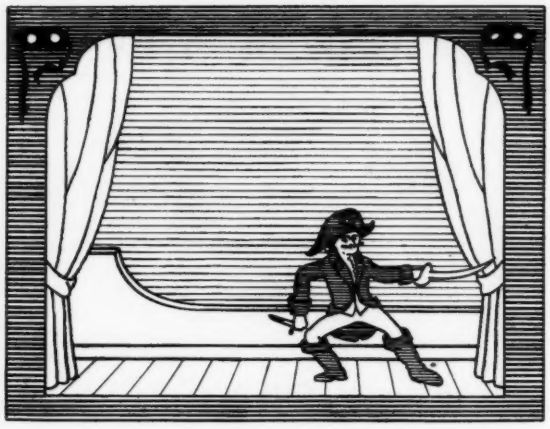


FIGURE III.

framed glass door hinged and locked to the front. Some are of smoothest hard wood, polished, enameled, or gilded. Others of rough hewed puncheons. Upon some the appropriate insignia appear in the form of bronze or silver plaques; upon others they are inlaid in the door frames. The back of each bulletin consists of a thin panel of soft wood, to which notices or posters can be pinned.

From the variety and cleverness displayed, it is evident that considerable rivalry exists between different organizations, each seeking to advertise its activities in the most novel and artistic manner, which is as it should be.

Figure III is an example of one of these boards, designed and used by the "Black Domino Dramatic Club." The inside edge of the door frame is sawed out to represent the front of a stage, with the club symbol, a black domino, in low relief, in each upper corner as the only decoration. Velvet curtains arranged on a wire just back of the glass are tied back as shown to reveal the club's announcements, or pulled together when there is no performance scheduled for the immediate future. The sketch shows an arrangement featuring a pirate cut from heavy bristol board and painted in appropriate colors standing upon his ship's deck. In the background appears the ship's bulkhead. The backdrop is a poster or program announcing the play from which this is a scene.

A brief description of a few of these bulletins will illustrate the variety of their uses and decorations.

Home Economics Club. The bulletin board is built to represent the entrance to a house, with porch lights or formal potted plants on either side, and the place of club meeting instead of the street number. The interior is furnished in cut-out paper furniture carrying out club studies in interior decoration. The club announcements appear on the back wall.

Art Club. The bulletin board is of conservative design in black and silver. The club program is printed upon a painter's pallet which leans against a background of draped silk. Several paint brushes are scattered in the foreground.

This system of bulletin boards may be adopted with worth-while results wherever there are organizations which can undertake their design and construction; decorate them so as to insure their being beautiful, permanent, and an object of pride to the group which they represent; and keep the displays up to date. Where this can be done they provide a splendid source of training in craft work and poster display, as well as stimulating friendly competition.

An enlargement upon the showcase type of bulletin board is carried out in many schools in the form of departmental exhibit cases. These are built on the order of photographers' show cases, and of such dimensions as will best accommodate the special type of work which they are to exhibit. Just as the bulletin boards described above are decorated to symbolize the organization whose activities they are designed to advertise, many of these exhibit cases are embellished with decorations in keeping with the nature of their exhibits. Sometimes they are built on the lines of some period style of furniture, or according to some historic school of architecture. More often, however, they are designed to conform to the scheme of interior decoration of the hall, studio, or shop in which they appear.

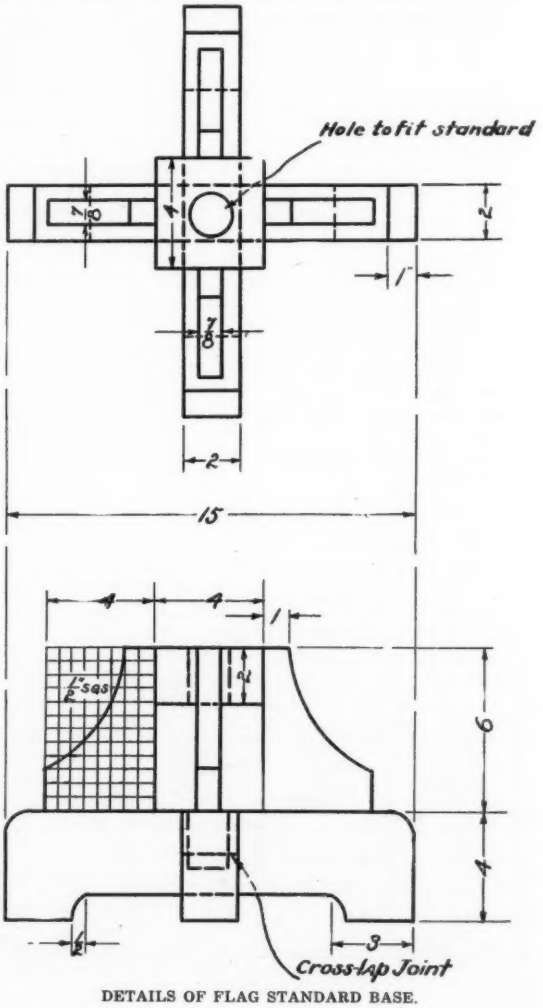
It is in vocational schools and in the industrial departments of other schools, that these exhibit cases are of especial value. Exhibits of work in home economics, turning and pattern making, machine shop work, jewelry, mechanical drawing, fine or applied art, wood carving or leather tooling not only stimulate pride among the students whose work is exhibited but provide an excellent method of showing the visiting public and the student body in general what progress is being made.

FLAG STANDARD BASE

Kenneth R. LaVoy, Instructor in Manual Training, New Rochelle, N. Y.

Since the majority of schoolrooms contain flags which are in many cases fastened to a standard, the manual training shops are frequently called upon to manufacture a suitable base.

In response to such a request the flag standard base shown in the accompanying drawing was designed and made. It has given great satisfaction, and possesses the advantages of not tipping over and being graceful in spite of its weight. The flag and standard may be easily removed when desired for parades and entertainments.



DETAILS OF FLAG STANDARD BASE.

HAVE YOU A SCHOOL SEAL?

Ensel J. Hawkins, Fairmont, W. Va.

We are all well aware of the fact that the mainstay in business is its advertisement. This can be in two forms, first by the printed page, and second, by the product it makes or handles.

A school stamp or seal is an aid in helping to put your school on the map. An attractive school seal placed on letters and packages is a clever way of advertising any school.

A SCHOOL SEAL.

The stamp or seal may have a more definite value by being used as a reward for work of merit, as on manuscripts, notebooks, drawings, and shop projects.

The above seal was chosen from a number of original designs worked out by a class in second year mechanical drawing after a study had been made of commercial trademarks, etc., and were printed with blue on white paper which are the school colors.

The designs for such school seals can be worked out by classes in mechanical or free-hand drawing, and can be printed or engraved by any print shop after the plates are prepared.

RACKS FOR DRAWING EQUIPMENT

W. V. Winslow and H. B. Mansfield, North Tonawanda, N. Y.

The teacher of industrial arts will find it necessary to construct or have his boys construct suitable racks for equipment. Where related mechanical drawing is given in the shop, the drawing being done on boards upon the shop benches, it is particularly advisable to stack T-squares and triangles that they may be at once carefully preserved, systematically arranged, and easily accessible.

The racks illustrated were worked out by boys of the woodworking classes with the assistance of their instructor and show most satisfactory holders for mechanical drawing equipment.

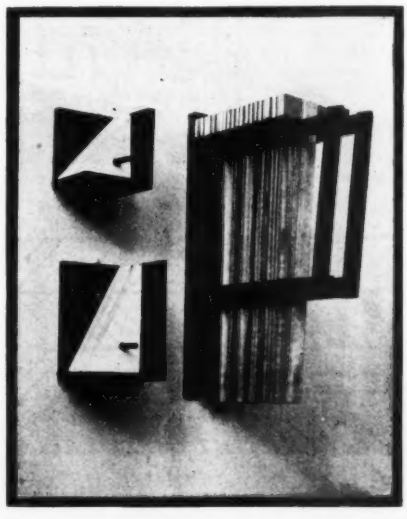


FIGURE 1.

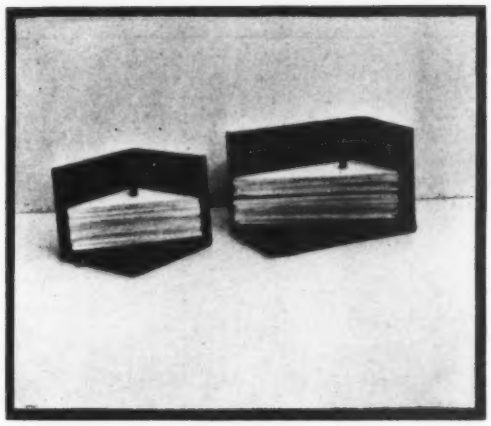


FIGURE 2.

Figure 1 illustrates the racks in position on the wall of the woodworking shop. The T-square rack is secured permanently to the wall with screws while the holders or boxes for the triangles are fastened to the wall by screw eyes over hooks.

Figure 2 shows the triangle boxes taken from the wall and placed upon the table where they are more convenient for individual use.

From the accompanying illustrations any shop teacher can readily understand the construction of the racks. The stock for the triangle boxes is $\frac{1}{2}$" thick, as is the back of the T-square rack. The brackets of the T-square rack are $\frac{3}{8}$" thick. Whitewood is used throughout. Nails are used excepting where the brackets join the back of the T-square rack where it seemed necessary to use screws. Fastenings, of course, will depend upon the construction.

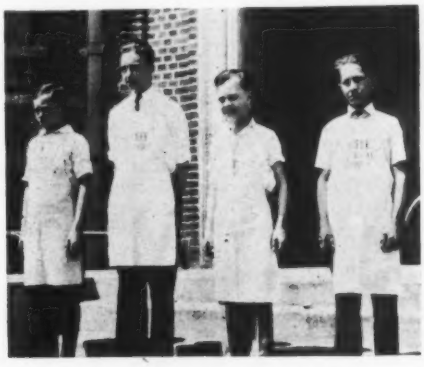
SHOP APRONS

Vick L. Langford, Instructor in Printing, O'Keefe Junior High School, Atlanta, Ga.

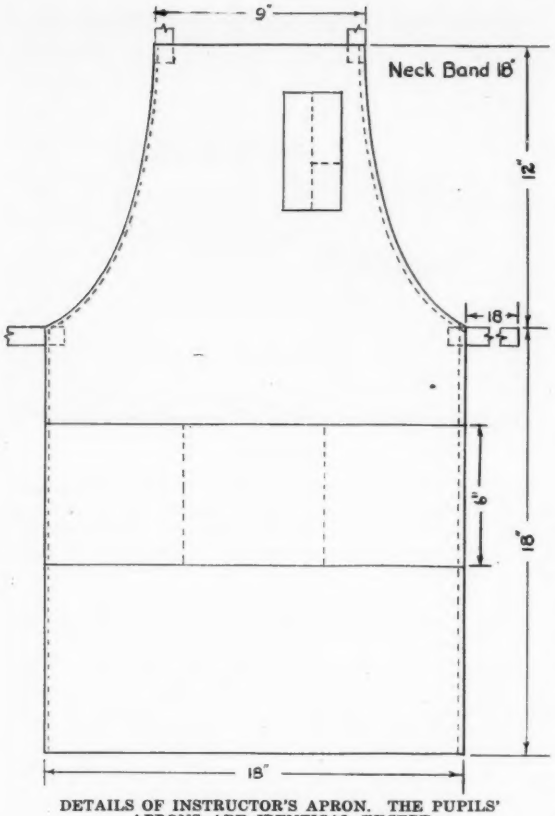
Every industrial-arts student should be provided with a good shop apron. Aprons can be made in the school shops, by a combination of the household-arts and industrial-arts departments, at a cost far below that of the commercial apron. The boy will like the idea, it will save his clothing and greatly improve the general appearance of the shop. Surely his mother will appreciate the protection.

At the O'Keefe Junior High School, Atlanta, Ga., C. R. Townsend, head of the department of industrial arts, was confronted with the problem of providing aprons for the use of students in the metal, electrical, woodwork, and print shops. In all, about one hundred aprons were needed, each class using the same set of aprons. This number included two aprons for each shop instructor.

Regular carpenters' aprons, such as are used by lumber companies and hardware dealers for advertising, were



THE APRONS AS THEY ARE USED.



DETAILS OF INSTRUCTOR'S APRON. THE PUPILS' APRONS ARE IDENTICAL EXCEPT FOR THE POCKETS.

priced at several places and the best price quoted for one hundred aprons was $40, or 40 cents each. These aprons carried the printed advertisement of the concern selling them. After talking the matter over with Miss Pauline Reynolds, head of the household-arts department, Mr. Townsend decided that the aprons could be made by a combination of the household-arts and industrial-arts departments.

One 60-yard bolt of eight ounce duck, 30 inches wide, was purchased at a cost of 23 cents per yard. For the neck bands and apron strings, the heaviest obtainable three-quarter inch binding tape was used. A class of seventh grade girls, under the direction of Miss Reynolds, made the aprons. The accompanying drawings will give enough information so that patterns can be made. The selvedge edge was left at the top and bottom of the aprons.

The instructor's aprons were made with three lower pockets and one divided pocket in the bib. No pockets were put in the aprons for the students as it was thought that they would be a "catch-all" for small tools, nails, screws, bits of wire, solder, leads, etc.

After the work had been completed in the sewing room, the aprons were sent to the print shop. Here the name of the school, and the name of the shop in which they were to be used was printed upon them, as is shown in the accompanying photograph. Eight and ten-line wood type was used for this job with a heavy flow of ink and a heavy impression. A double impression may be taken if one does not prove satisfactory. This work was done on a 12"x18" platen press by putting the apron strings under the lower clamp and holding the apron taut while taking the impression.

The mechanical drawing shop helped out in this school shop project of apron making by numbering the aprons from 1 to 20 or 1 to 25, depending on the number needed for each shop. The figures were outlined in pencil from a one-inch stencil and then filled in with waterproof drawing ink.

At the O'Keefe Junior High School a regular system of numbered tool checks is used in the tool rooms of the woodwork, electrical and sheet-metal shops and in the print shop each boy is assigned to a numbered case and case stand. This is the reason for numbering the aprons and a boy may then use the same apron each day. Each apron, however, is used in turn by five or six boys each day, depending upon the number of periods taught daily in that shop.

In keeping the records for the first few days, these numbers help the instructors to learn the names of the boys, as each boy's number also appears opposite his name on the record charts and roll books.

Any instructor of industrial arts has seen a boy ruin his shirt or some other article of wearing apparel in the school shop and many times the students of the manual training class come from the shop with their clothes in such a condition that it is a discredit to the instructor and the shop course as well. A mother who has tried to wash out the stains on Johnnie's shirt, resulting from contacts with printers' ink, wood stain, or paint, surely will appreciate the apron idea. In the sheet-metal shop a boy sometimes gets acid on his clothes and one such accident will often cost more than half a dozen aprons. Furthermore, if a shop class is uniformly equipped with good aprons, the appearance of the shop will be greatly increased. If the reader has even seen a company of recruits in "civies" and has later seen them in uniform, he can get the idea.

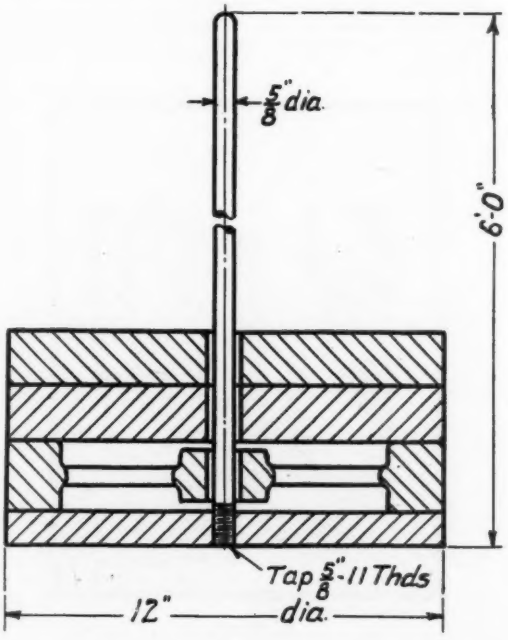
If five boys use an apron each day, which cost fifteen cents, the cost per boy is only three cents. Surely if we are attempting, among other things, to teach care and respect for good tools, we can apply the same principle to a boy's clothing and furnish him with a good apron.

STOCK ROOM EQUIPMENT

J. A. Miller, New Kensington, Penna.

Instead of building bins, shelves or racks in your stock room for storing pulleys, sheave wheels, small flywheels, etc., try this: Take a piece of cast iron about 12" in diameter (or 12" square if desired) and 1" thick and thread in center with a ⅝"-11 thread. Cut off a piece of ⅝" C. R. steel about 6'-0" long and thread one end for about 1½" of its length and insert it in the plate.

The pulleys, etc., will most likely be cored and can be slipped over the rod. If they are not cored, it will not spoil the job to put a 11/16" hole in the hubs.

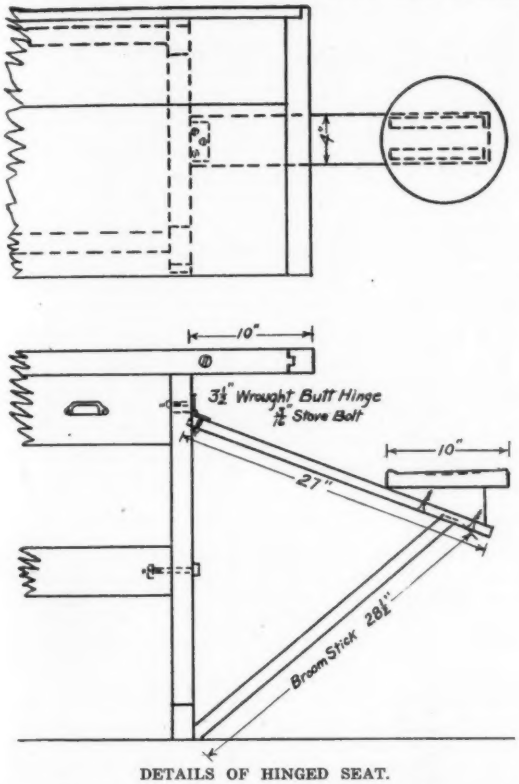


If a piece of cast iron of the size mentioned above is not available, one of the parts to be stored can be used for the base plate. A rod much longer than specified can be used, but it is not advisable on account of the excessive lifting necessary to pile the castings. It is possible, using this simple means, to store from 20 to 35 discs of various sizes and yet use a maximum floor space of not over 14" square.

HINGED SEAT

Arnold L. Pearse, Roswell, N. M.

Many find it necessary to conduct a drawing class in the bench shop at some time or other when rooms are at a premium. We have, therefore, seen devices, the purpose of which was to adapt the bench for use as a drafting



DETAILS OF HINGED SEAT.

table. There is generally no place available to store stools or the customary board rest which is clamped in the vise while in use. The hinged seat here illustrated is simple, takes no valuable room in the shop, may be placed in position with little disturbance and affords the boy a comfortable seat while drawing.

The circular seat piece may be turned in the department and in addition to this all that is needed is the hinge board of suitable length with one strong hinge for hinging to the bench, a wedge board for leveling the seat board, and a broomstick as a weight support.

If well made this seat will stand the wear as well or better than a stool.

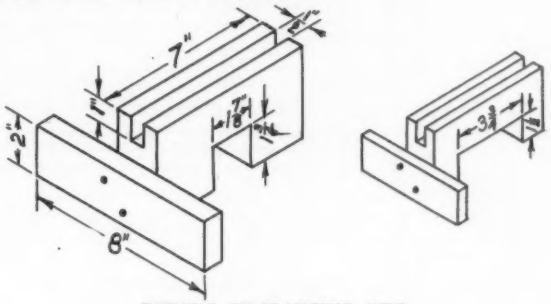
A CLAMPING AID

H. A. Bailey, Supervisor, Bluefield, W. Va.

Every instructor whose students use steel-bar or cabinetmakers' clamps has felt the need of having some means for holding these clamps in an upright position. Some instructors have solved this by sawing notches in the saw horses or trestles, thereby weakening the horses for their regular use. Others have built special frames to hold the clamps. Believing that I have discovered a better plan, I am passing it on to fellow workers.

The accompanying illustrations show a very simple, cheap, and efficient type of clamp holders which have been in use in our Beaver high school shops for several years and which are now considered indispensable. All that is needed to construct them is a boy with a few minutes of time, and a saw, a chisel, a hammer and finally a few short pieces of common 2"x4" studding—such pieces can be found around almost any building construction.

It should be noted particularly that these holders can be used either on the saw horses—where they may be adjusted for any width or length of stock—or on top of any bench or table. They also take up a minimum of storage space when not in use and in no way interfere with the regular use of other equipment.



DETAILS OF CLAMPING AIDS.

In the smaller illustration is shown a holder which may be used with a saw horse such as is sometimes made with the top piece laid flat instead of on edge.

DRAWING ROOM CABINET AND MAGAZINE FILE

H. L. Weatherby, Montgomery, Ala.

The cabinet illustrated is an article, the demand for which arose originally in the accumulation of THE INDUSTRIAL ARTS MAGAZINES and other technical magazines.

It has been the policy of the teachers of the manual arts department of the Montgomery schools to file these magazines and to keep a card index system, similar to

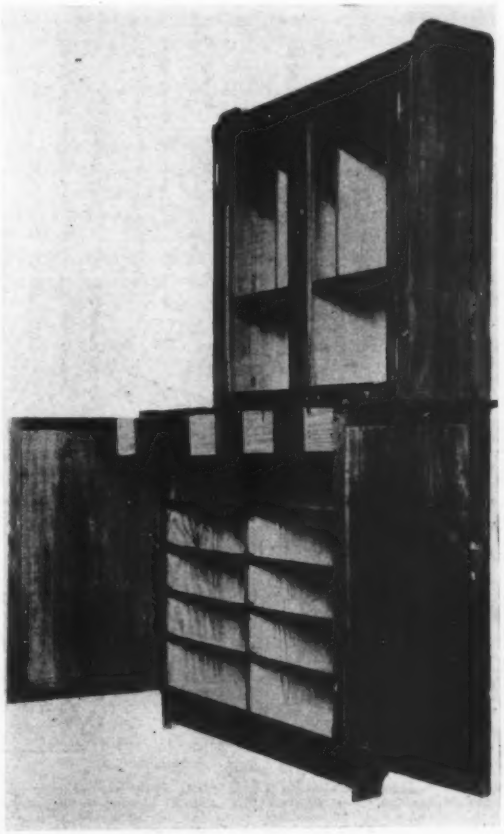
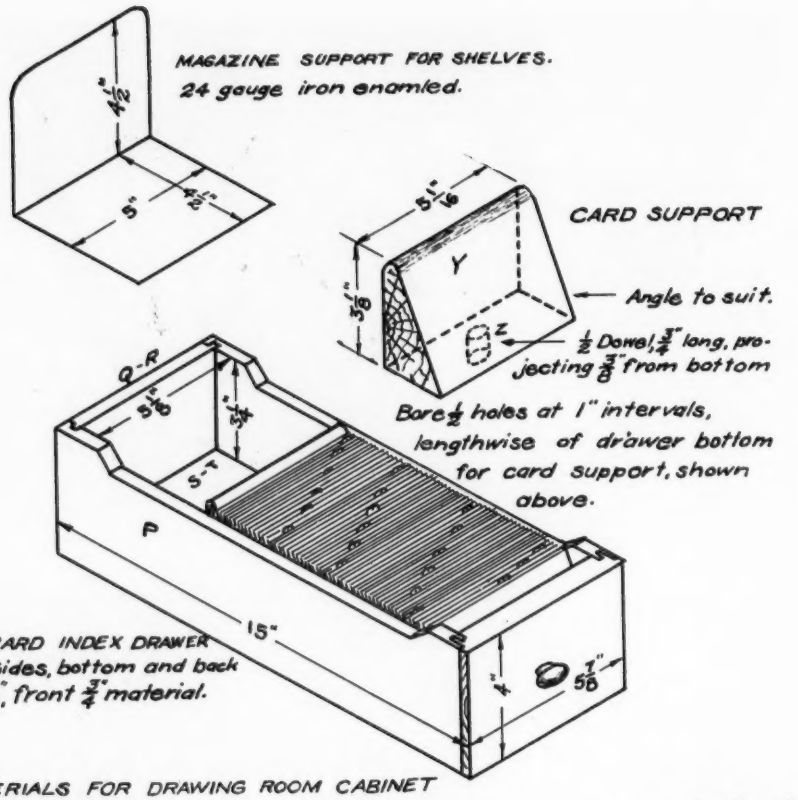


FIGURE 1. DRAWING ROOM CABINET.



MATERIALS FOR DRAWING ROOM CABINET

A	2 - ¾" X 17½" X 72"	M	1 - ¼" X 34¾" X 17"	Y	1 - 1½" X 3⅜" X 5 1/16"
B	1 - ¾" X 19" X 37"	N	4 - ¾" X 4" X 5⅜"	Z	1 - ¼" X 36½ X 64½"
C	2 - ¾" X 1½" X 19"	O	1 - ¾" X 4" X 9"	z'	1 - ½" X ¾" dowel.
D	3 - ¾" X 9¼" X 35½"	P	10 - ⅜" X 4" X 15"		
E	4 - ¾" X 1½" X 32⅛"	Q	4 - ⅜" X 4" X 5½"		
F	4 - ¾" X 1½" X 17"	R	1 - ⅜" X 4" X 8⅜"		
G	4 - ¾" X 1½" X 30⅜"	S	4 - ¾" X 5½" X 14⅜"		
H	4 - ¾" X 1½" X 17⅜"	T	1 - ⅜" X 8½" X 14⅜"		
I	2 - ⅜" X 15¼" X 28½"	U	10 - ¾" X 1½" X 17"		
J	1 - ¾" X 16½" X 35⅜"	V	2 - ¾" X ¾" X 17"		
K	1 - ¾" X 15½" X 18⅜"	W	3 - ¾" X 3½" X 35½"		
L	4 - ¼" X 16⅜" X 17"	X	½" X 9¼" X 12¾"		

FIGURE 3.

DRAWING ROOM CABINET
SCALE :- 3/32" = 1"

All material ¾" thick unless specified otherwise. Glass in upper doors. Wallboard back. Assembled with nails and screws.

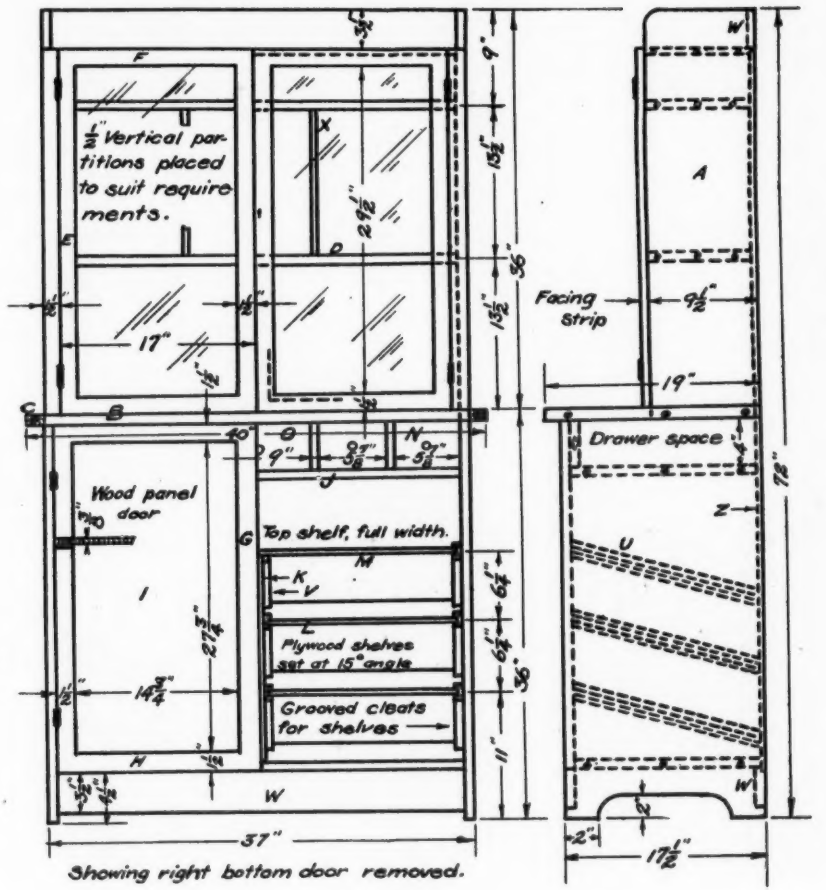


FIGURE 4.

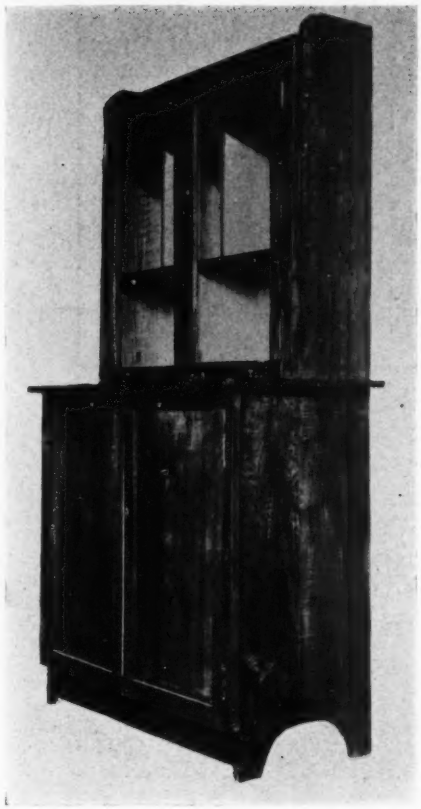


FIGURE 2. DRAWING ROOM CABINET.

several explained from time to time by subscribers to THE INDUSTRIAL ARTS MAGAZINE. These cards have been kept up to date by adding material from month to month as the magazines arrive. Shelving space originally built for books, being inadequate, this cabinet was designed to meet the demand.

The upper part is 9½" deep and the shelves are of a height to accommodate a 9"x12" magazine, which seems to be of a standard size adopted by a number of other technical magazines coming to our shelves. Thin, upright partitions are placed at intervals, as these seem to be of considerable aid in preventing the magazines from sliding down as they accumulate. These partitions will also help in keeping the various periodicals separated, or if placed at regular and proper intervals in keeping the file by years. The drawers under the projecting table part are deep enough to be of considerable service. One is used as a 3"x5" card index file for the shelves. The titles of all articles of interest, and most articles are likely to be of interest at some time or another, if available, are typed on these 3"x5" cards under appropriate headings and filed according to alphabetical placing.

Another drawer with a hinged lid over the front half which has a slot in it like a child's penny bank, is used for small change that is collected in the department for fees and certain supplies. Other drawers are used for pencils, brushes, and various instruments and paraphernalia used in the drawing room.

The bottom part is fitted with plywood shelves which slant at an angle of fifteen degrees, the top shelf running full width of the cabinet; while the space for the other shelves is divided into two equal compartments by a ¾" vertical partition. These sections or shelves will accommodate standard size drawing papers as used in most school drafting rooms, and provide an excellent place for filing completed drawings. One of these slanting compartments may be fitted with a light, tight drawer for unexposed blue print paper. This paper may be purchased, cut to convenient sizes, at a very slight additional cost, and at a great saving of trouble in handling. This paper kept under ordinary conditions will give satisfactory prints after two or three months' time, and it is well to have some light-proof accessible place for storing it.

Both the upper and lower doors are fitted with locks. The back of the cabinet is plain wall board which is easy to handle and comes in wide widths. The drawer bottoms, with the exception of the filing case, may also be made of this wall board. The cabinet was made of seasoned pine, assembled with nails and screws, stained a brown oak to match other furniture in the room, and was built by students in the woodshop. The shelves in the bottom, if not made of plywood, must be reinforced by pieces across the front and back to add strength, or constructed from heavier material than the drawing specifies.

As an additional aid in keeping magazines upright, several book-ends were made of rather heavy gauge iron as illustrated. These are very easily made, take up practically no space, and are of a great assistance in keeping the appearance of the shelves orderly. These with the aid of the upright partitions should make the shelving and filing of magazines a rather simple matter. The cabinet has proven to be a well-nigh indispensable object in our department and should be a very useful piece of drafting room furniture in any school.

THE PI PIPER

Ralph A. Loomis, Jersey City, N. J.

Into the awful "hellbox" swishes the type by the quick hand of the furtive, slick boy in the school printshop. He tries to put an end to it. Not so—the strutting printing instructor, noting the increased depth of pi, blows a staccato call on his long, shiny "reed"—they all know its meaning.

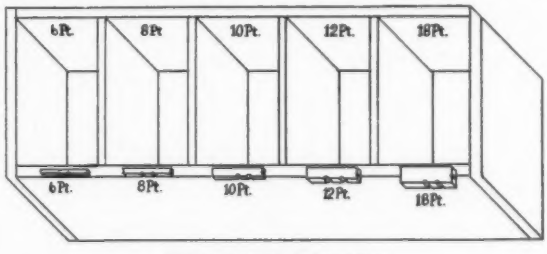
Swiftly (?), noisily, they drop—the little 10 pt., 12 pt., etc., perhaps members of historic families, such as Cheltenham, Caslon, Schoeffer or Della Robbia—into divisions of the pi sorter. Here comes 12 pt., here is 18 pt., and more and more and more—into their respective quarters they are led according to point-size—family not considered.

Now they are stood up in the stick by willing (?), quick (?) little boys' fingers—ranks of little type children—all of noble lineage—but all the same size. Into the caverns of the "Pi-Piper-Box" (sort-case), they are marched—no resisting the Piper's call. There goes Cheltenham Bold back to the family fold; now Cloister finds his fancy flourished kin; and there is Lining Gothic Italic back among his slant brothers. All are hurried (?) to their respective caverns in the cave of the great sorter.

Let the call resound until all come back to follow a more joyful, useful, profitable life than that in the terrible "hellbox."

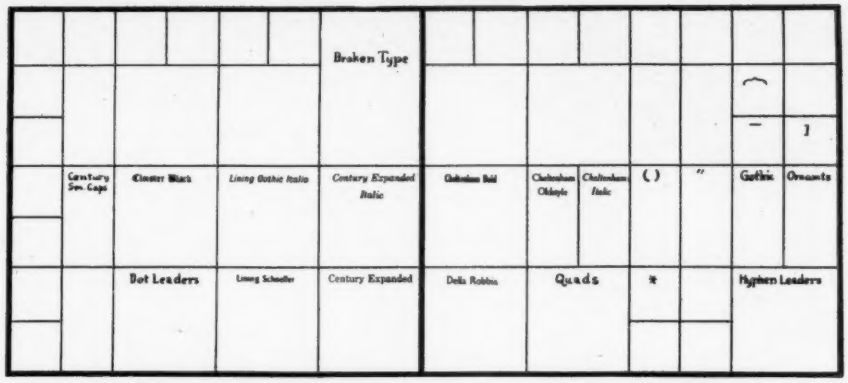
Let us look at this sorter and then we may know how the "Lead Children" follow the sound of the "reed" of the Piper. Let us see how it works—because it does work and will work for any shopworn Piper.

An ordinary box about 18" long, divided into sections with little board partitions, is all it is. Each division holds 10, 12, 18 or any point letter as wished, but be sure



THIS IS THE "SORTER."

By putting the same point size type in its respective box the pi is separated by points. Notice that a letter is glued on the edge of each box. After the type has been separated in this way it may then be set up quickly without regard to font and then it is ready for the "Sort Case."



THIS IS THE "SORT CASE" INTO WHICH THE SET UP PI IS DISTRIBUTED.
The names of the different families of type are glued to the sides of the boxes which guide the distributor. In this work his ability to distinguish type faces is developed.
A "Sort Case" may be prepared for all point sizes of type.

a letter is securely glued on the edge of each section so that the precious little printer boys (devils no more), may not be able to say, "I can't help it, how can I tell the right size for that box?" Begin with the little size pi's and go up in size, as they run naturally—let each size have a section.

Now, give the little boys some of their delectable pi. Let them chew it in the sorter, digest it in the sort-case, and assimilate it by returning it to the case from which it was allowed to escape. This will work. It took a long time trying ways suggested by other suffering Pipers before it was devised—though so simple.

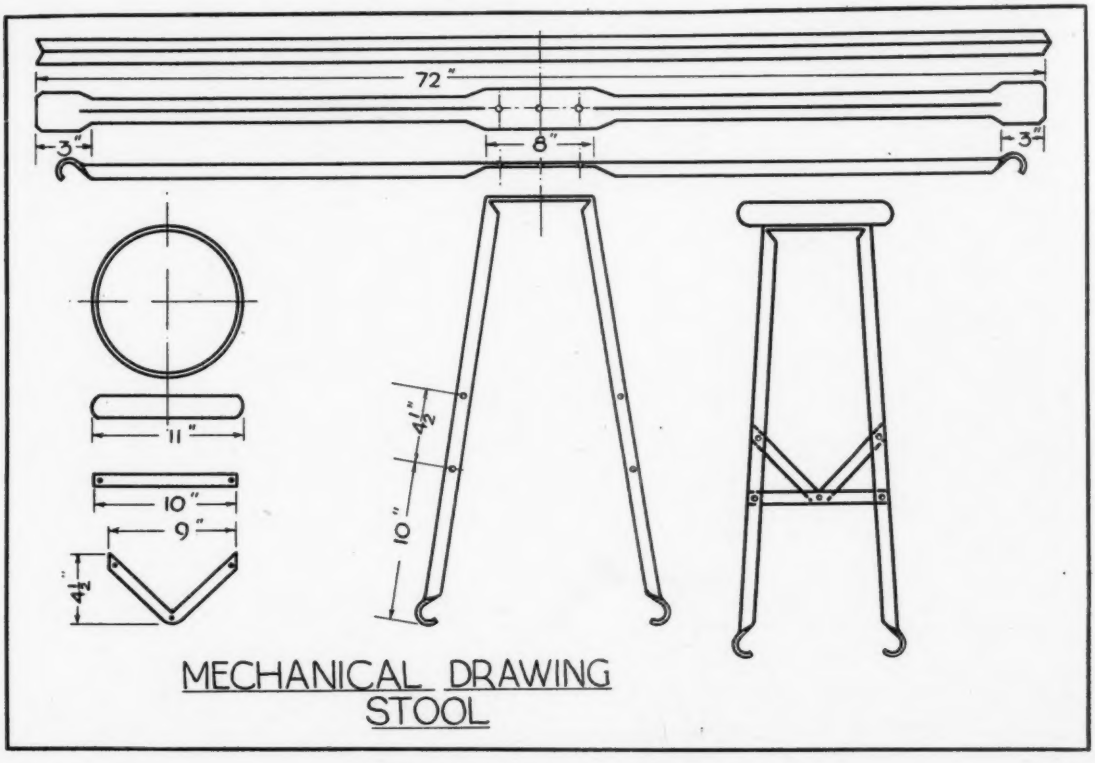
A glance at the drawing of the sorter will explain how to use it. The labels on the boxes indicate the point of type that each should contain. Put the box in the center of a table and let the boys sit at ease with their plates of pi. They may now learn to select a 6 pt. or a 10 pt. letter. Let them put the letters into the sections as marked. A little experience here may influence them against letting accumulations of this kind gather again.

Look at the sketch of the sort-case. Note the labels on the boxes. The label is a proof of the type that should be put in that box. Keen eyes and a conscience, respected, are necessary when working at the sort-case; but it is good experience. Here the lines of type are set up. Members of families of the same point are assembled. They are distinguished as nationalities are, by their physical and facial characteristics. Ability to recognize them is developed.

A STOOL FOR DRAWING ROOM AND SHOP

C. R. Lindstrom, Redmond, Ore.

Economy and durability are the features involved in the accompanying illustration of a stool. This stool was designed by the students of the mechanical drawing class at the Redmond Union High School in Oregon. The chairs are so constructed that the materials required to make a set of eight would cost just a dollar each, which would include the cost of the coal used in the bending of the angle iron. Properly constructed the chairs are almost indestructible.



DETAILS OF MECHANICAL DRAWING STOOL.

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TRACING SUPPLEMENT No. 81.
THE INDUSTRIAL-ARTS MAGAZINE.
DECEMBER, 1936.

TRACING SUPPLEMENT No. 81,
THE INDUSTRIAL-ARTS MAGAZINE,
SEPTEMBER, 1936.

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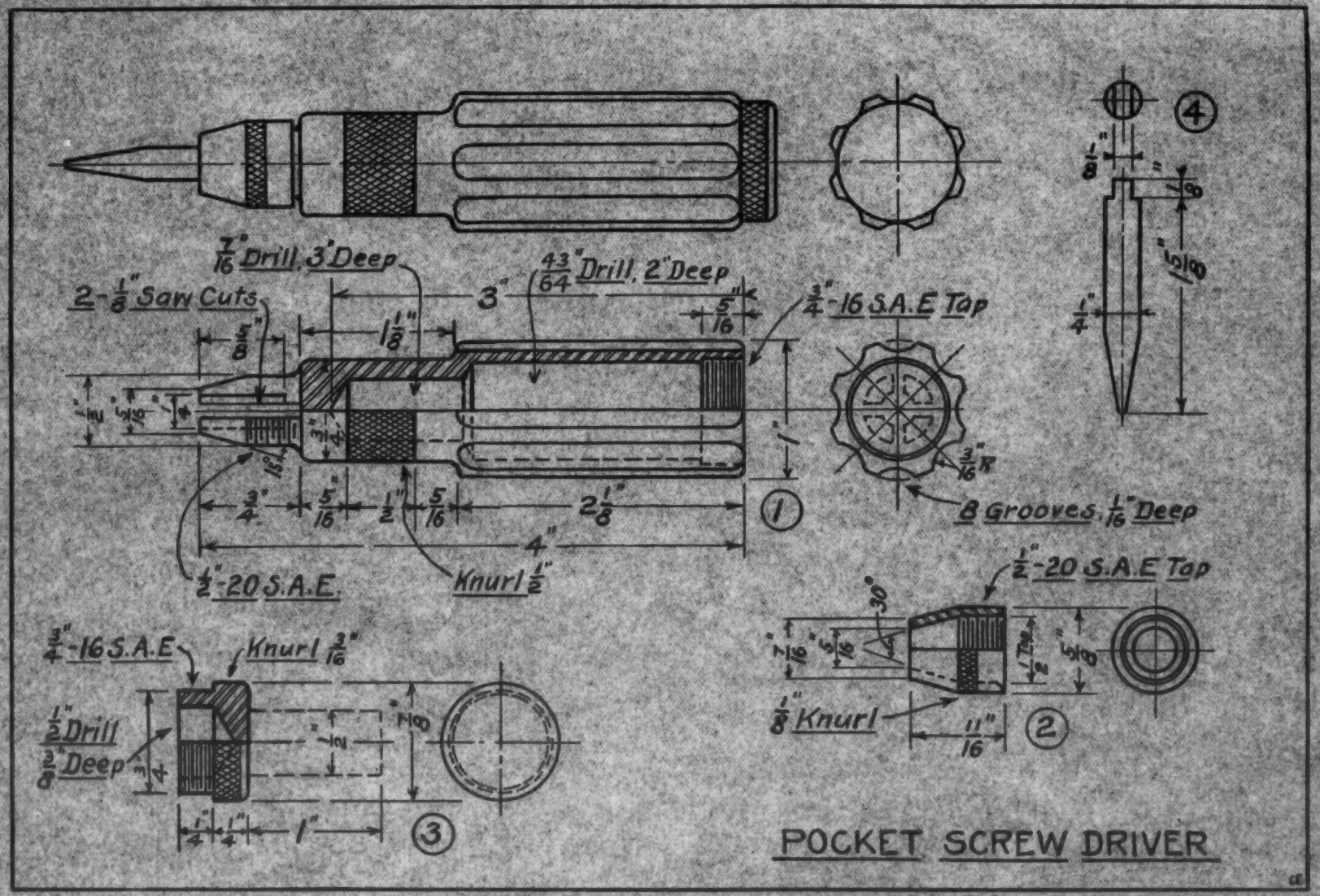

Designed by Harold W. Hanson, Dover, New Hampshire.

For Details See Problems and Projects Department, Industrial Arts Magazine, September, 1936.

THE INDUSTRIAL-ARTS MAGAZINE,
SEPTEMBER, 1926.

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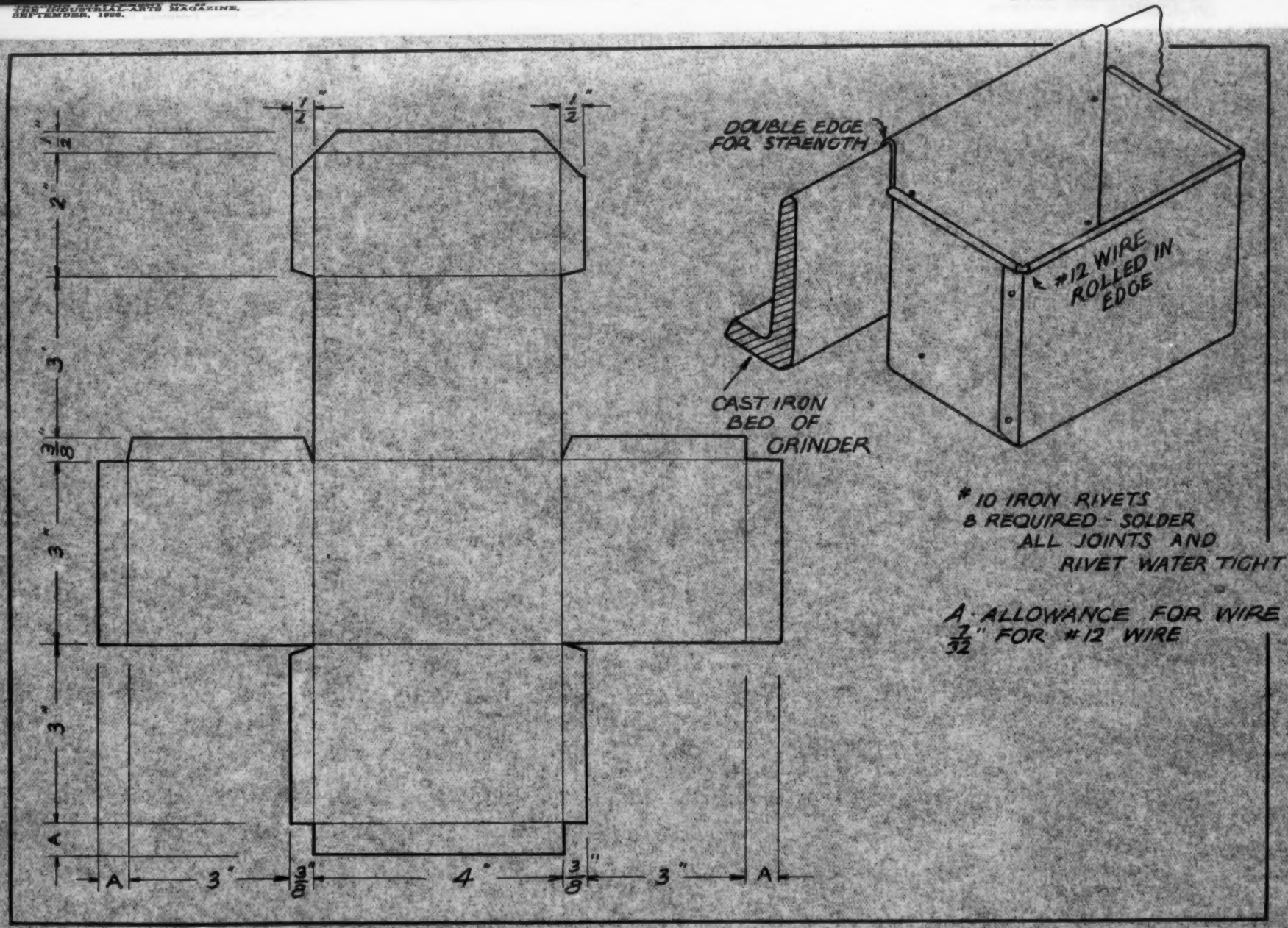


Designed by Fred G. Evans, Hamilton, Ontario, Canada.

For Details of Water Container See Problems and Projects Department, Industrial Arts Magazine, September, 1926.

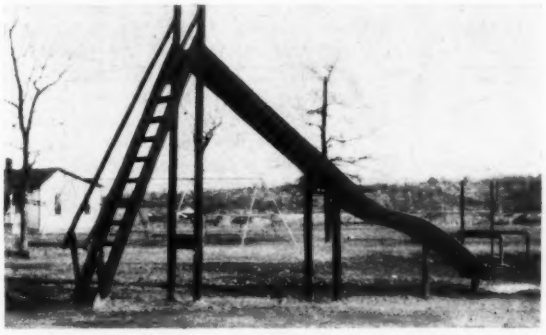
The legs of the chair are made of ¾" angle iron and the cross bars are made of the same size in band iron. Ordinary sickle rivets were used to fasten the parts together. The top is made of fir, a plank of 12"x12" sufficing to make this part. It can be turned out on the turning lathe, as it was in this case, or the hand work pupils can make it. Ordinary wood screws fasten the top to the bars across the top.

This stool is an excellent construction problem for several classes: making the legs of the chair provided an excellent class project for forge students and farm shop class. Beginners did practically all this work. The tops make a good problem for the wood turning class, who also in this case were beginners at turning. And the manual training class or hand work class find an excellent problem putting the chairs together.

A PLAYGROUND SLIDE

R. T. Randol, Fort Smith, Ark.

This slide was made by the eighth grade woodworking class at Flat River, Mo., for general use on the school playground. The slide is made without a single nail. Bolts and screws were used throughout so that it would give the best possible service. The slide is 28 feet long, 26 inches wide, and 10 feet high and has given splendid satisfaction.



THE SLIDE READY FOR USE.

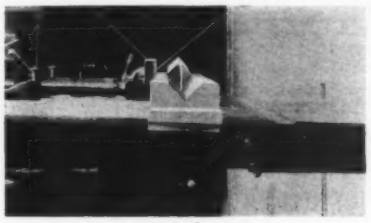
A GLUE BLOCK JIG

J. D. Wilson, Los Angeles, California

While most of the "universal saws" have attachments that permit the turning up of the table until it is at a 45 degree angle, it is not an easy operation for the average high school student to use the saw with the table in that position.

The jig, as shown in the picture, obviates the necessity of turning the table at all.

Turn the table to a 45 degree position and then saw, out of a piece of stock 2 inches or 3 inches thick, a v-shaped cut, the size of the v depending on the thickness of this stock and the diameter of the saw. Length of this stock should be at least 12 inches longer than the saw table.

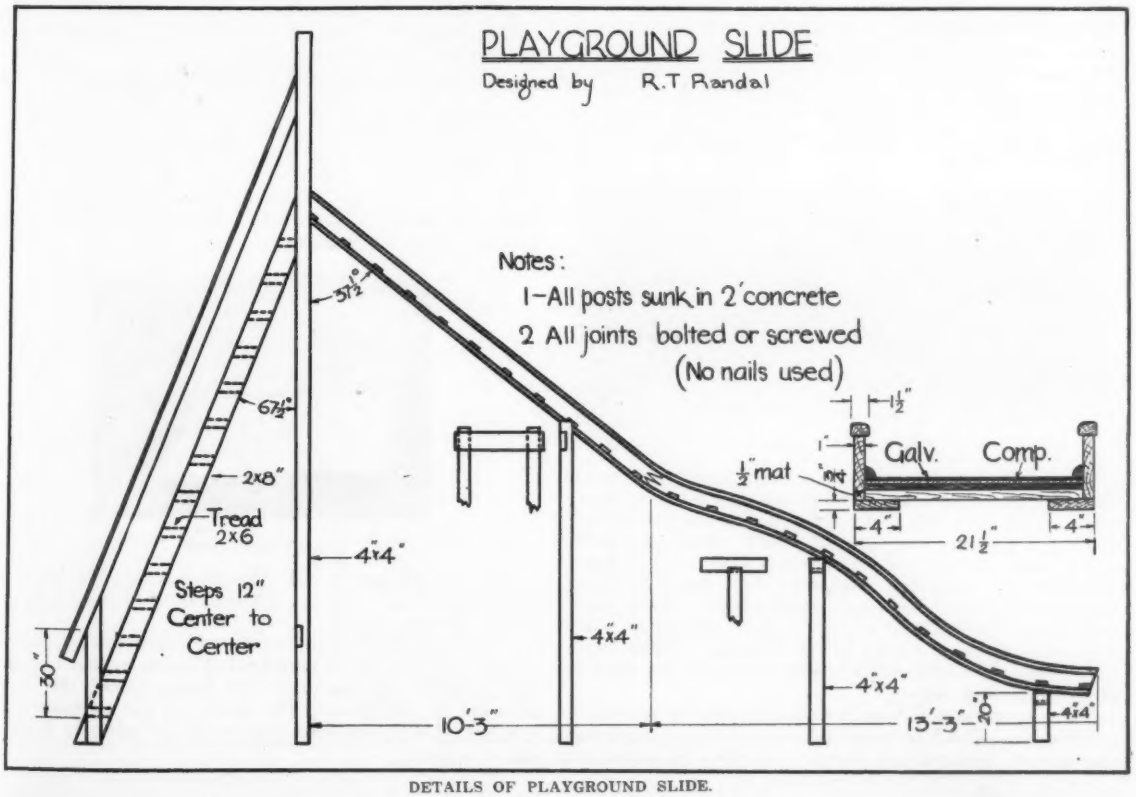


THE JIG.

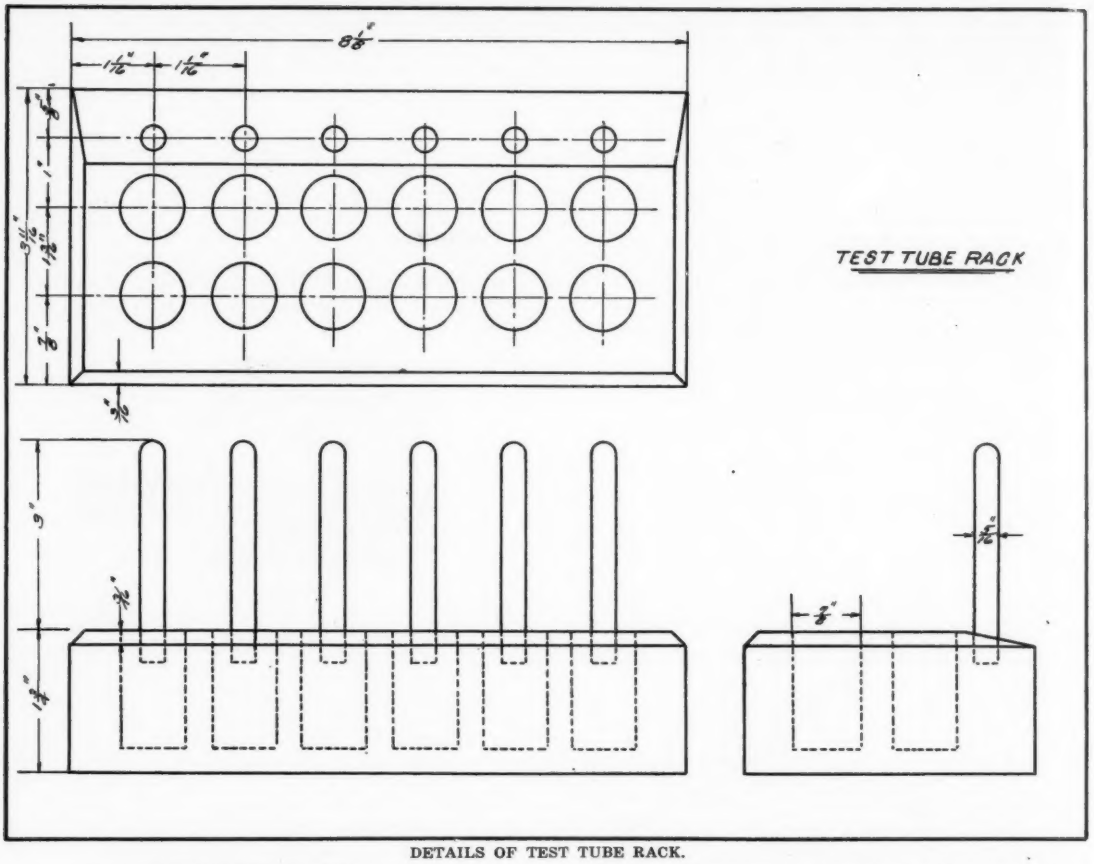
Return the table top to its level position and place the v piece on it with the center of the v directly over the saw. The saw, of course, will be "down." Mark the under side of the jig at the ends of the table. Take off and nail on two blocks to prevent any end play when the jig is in use. Replace on the table, as before, using the rip saw fence as a guide to hold up the jig sideways. Then carefully turn up the saw, while in motion, through the bottom of the v.

The jig is now ready to be used. Feed the material to the saw as usual, the only difference being that the stock to be ripped will be on a 45 degree angle to the saw.

The jig will take any size of material up to the limits of the saw.



DETAILS OF PLAYGROUND SLIDE.

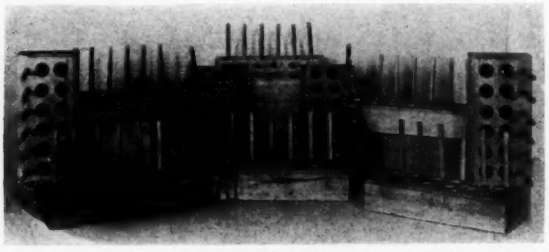


DETAILS OF TEST TUBE RACK.

TEST TUBE RACKS

Geo. H. Wichman, Coleraine, Minn.

It is seldom that school production work in the woodworking department possesses much value from the teaching standpoint. Usually such problems, although adding to the school equipment with economy, mean a considerable loss of time on the part of the pupil and demand a surplus of time on the part of the instructor. However, in the production of the test tube racks shown in the photograph, there is real teaching value in addition to the productive element.



TEST TUBE RACKS.

It seems that the test tube racks commonly found on the market and chemistry laboratories are unsatisfactory in that they are made of too light material, do not withstand moisture and soon fall apart. Also these racks due to their lightness are very unstable and result in many accidents and much inconvenience. With the aid of the instructor of the Chemistry Department, a design was worked out which aimed to correct these difficulties. The result was the rack shown in the drawing. These racks were found to be very stable and to withstand any amount of moisture and abuse.

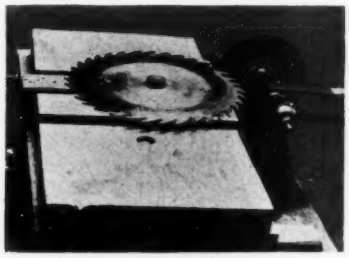
The construction work was carried out by an eighth grade class. The blocks are of maple and all squaring, chamfering, sanding and boring was done by hand. A jig was used, however, for securing uniformity in laying out and boring holes for dowels and test tube holes. A dowel cutter head attached to turning lathe was also used in cutting the five-sixteenth dowels. After the racks were sanded they were dipped in a hot bath of paraffine to protect against moisture and acids.

A SAW GUMMER

J. D. Wilson, Los Angeles, California

Secure a small emery wheel stand and a ¼ inch or ⅜ inch wheel to fit the same.

Fasten this to a table top of convenient height and also fasten a piece of 2 by 12 to the top. Provide several inches of end play to this piece by slotting the top of the table, and fastening the 2 by 12 to the top through these slots by using thumb bolts.



THE SAW GUMMER.

At right angles to the 2 by 12 and into the top side of it dovetail a groove, say 3 inches wide. Fit a hardwood guide into this groove.

Bore a hole of about an inch diameter near one end of this guide. Turn a hardwood cylinder so that one end will fit this hole, the other end being turned the exact diameter of the hole in the center of the circular saw. For several different-sized saws, make cylinders to fit each size.

Place the saw to be gummed on the top of the 2 by 12 and over the cylinder; then slide the movable top endways until the desired angle at which to gum the saw is reached. Lock by tightening the thumb bolts.

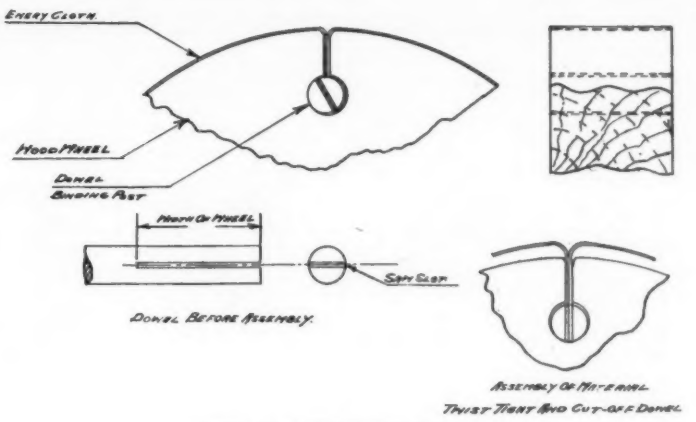
Push the saw carefully into the revolving wheel until the required depth of the saw gullet is reached. Bore holes at the outer end of the guide, the diameter of an 8d common nail. A nail in one of these holes will stop the guide at the desired point.

This jig makes a very efficient saw gummer. A turning lathe can be utilized to provide the motive power.

A MACHINIST'S CLAMP

C. S. Jones, Wyandotte, Mich.

The clamp illustrated is very handy and combines several useful machine operations in its construction. The material is cold rolled steel, which may be case-hardened. The screw is turned in the lathe and can be threaded in the lathe. The jaws, or body of the vise, can be made in the milling machine or in the shaper. The movable jaws are shown in two designs. The advantage of one jaw is that it gives a larger opening than the other.

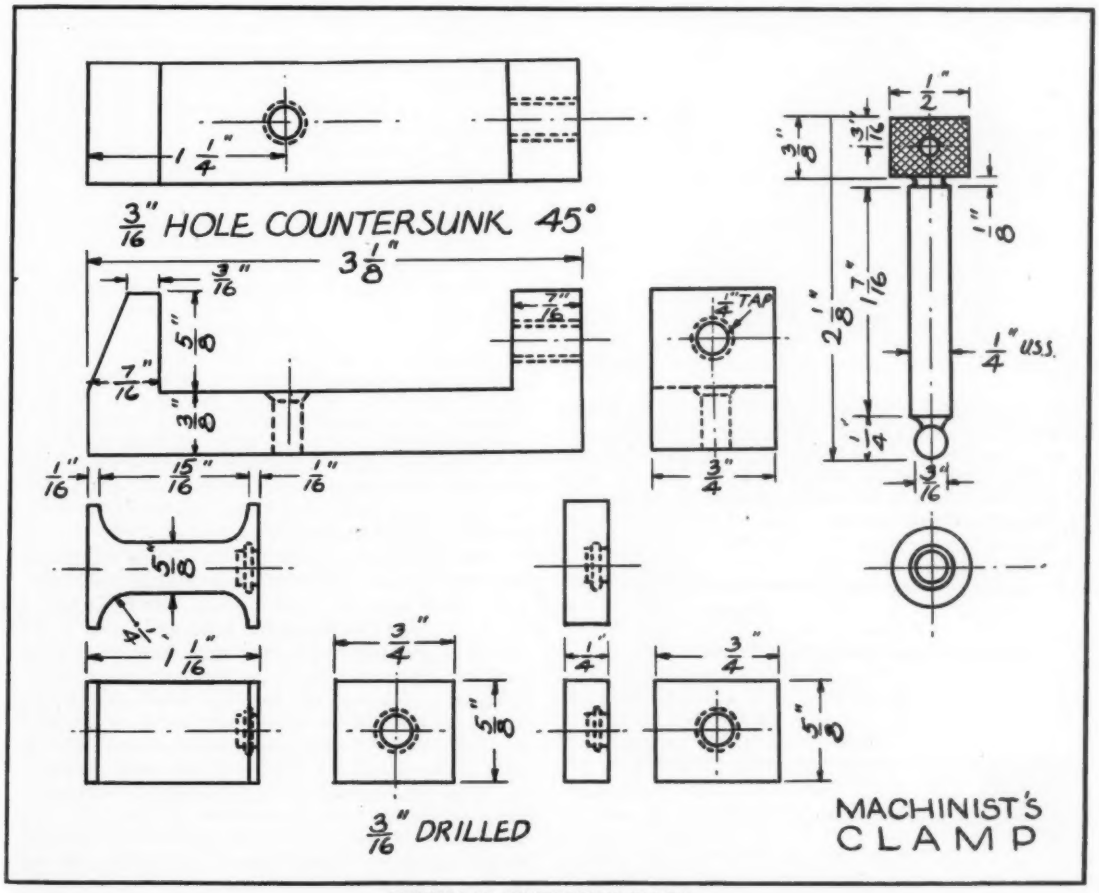


DETAILS OF POLISHING WHEEL.

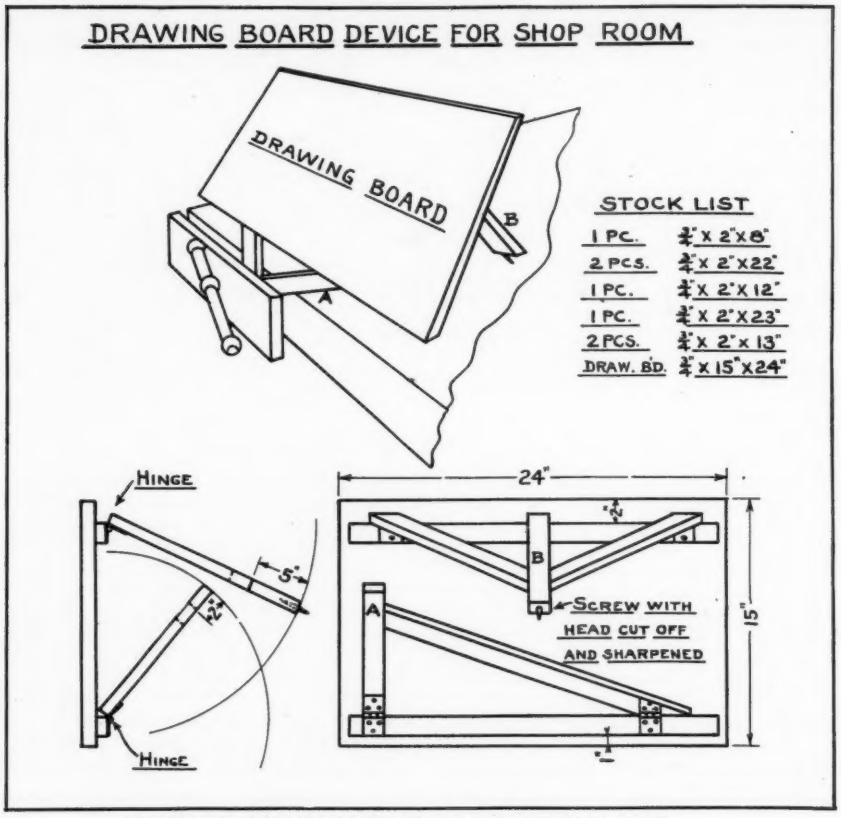
A POLISHING WHEEL FOR THE MACHINE SHOP

Frank L. Young, Ontario, Calif.

Frequently the use of a polishing wheel arises and the old method of holding the material is resorted to, that is, the use of the wedge. By the use of a wedge a gap is made that causes the work to jump, soon wearing the sandpaper or emery cloth. The method shown here is simpler, far quicker, dispensing with the gap and giving an almost continuous surface. After securing a wheel of proper diameter, a hole is drilled about three-quarters of an inch from the surface of the wheel. The diameter of the hole is governed by the size dowel used and double the thickness of the material. A slot is cut from the surface of the wheel to the hole. The width of the slot is twice the thickness of the material. The corners of the slot on the surface of the wheel should be rounded. A wood dowel is slit the width of the wheel. To assemble, cut the material two inches longer than the circumference of the wheel; insert the ends in the slot of the wheel and the dowel; twist the dowel until the material is drawn tight on the wheel; cut the dowel flush with the side of the wheel. This practically returns the material that



DETAILS OF MACHINIST'S CLAMP.



DETAILS OF DRAWING BOARD DEVICE FOR THE SHOP ROOM.

was drilled out, giving a near balanced wheel. To renew the paper, the dowel is knocked and the operations are repeated. I have found this method to work satisfactory and thus far have never had a dowel come loose, allowing the sandpaper or emery cloth to pull out.

A DRAWING BOARD FOR THE SCHOOL SHOP

A. I. Kittleson

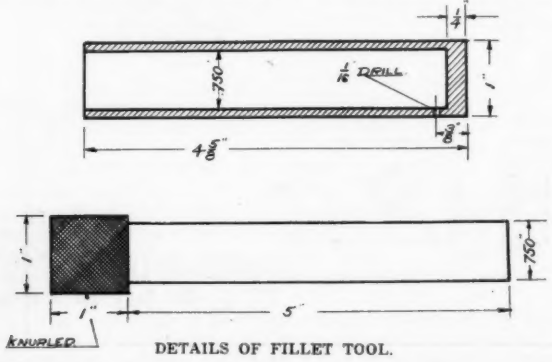
This drawing board is simply made of soft wood and has been found entirely satisfactory. The support can be pulled forward or backward, lowering or lifting the board.

A TOOL FOR MAKING WAX FILLETS

S. W. Rounds, Waltham, Mass.

The writer has found this tool a very good problem for the machine-shop and a quick method of producing necessary fillets.

The part with the hole in it can be made from a piece of one-inch cold rolled steel. This can be bored out in the machine-shop on the lathe, using a universal chuck. The hole should then be reamed out in order to get a good fit. The plunger should be carefully fitted in order that the wax will not escape out of the end of the opening under pressure. The small hole indicated on the drawing can be of any size desired.



DETAILS OF FILLET TOOL.

In order to make the fillet the hollow part should be filled with wax, the plunger inserted and then the assembled tool placed between the jaws of a machine vise. Exert a steady pressure and a long wax string will come out of the small drilled hole. The string should then be wound on a spool in order to preserve it.

If the wax does not run smoothly, the tool should be slightly heated over a gas flame. It does not require much heat in order that the wax will flow freely.

AN EASY WAY TO TRUE UP OLD OIL-STONES

Carl L. Meritt
Tonawanda, N. Y.

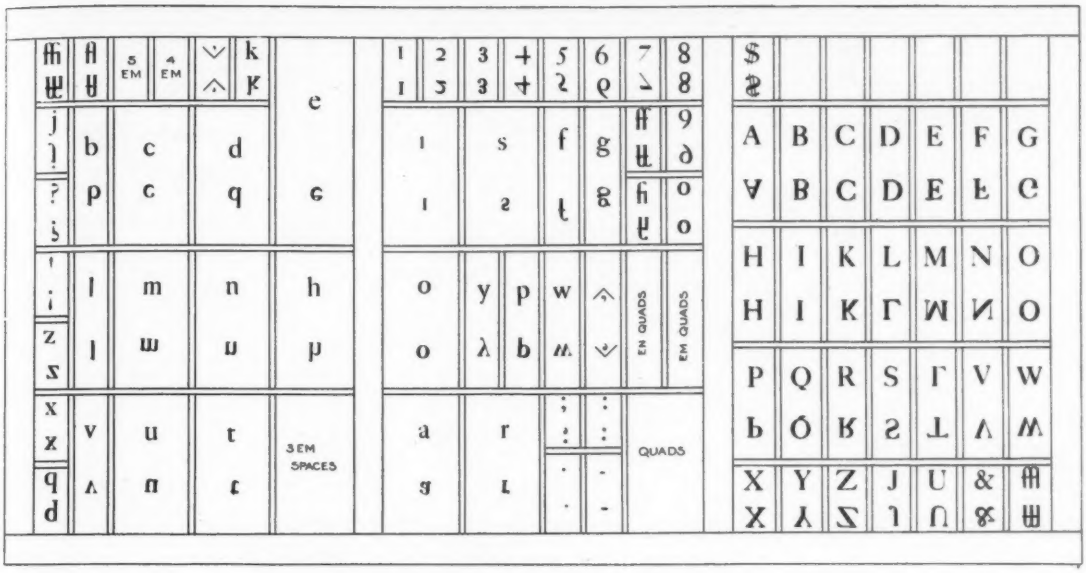
Some years ago I came to believe that one of the lasting benefits which might be derived from a course in woodworking processes was the appreciation of sharp tools to work with and the desire to have them when it is within the bounds of reason. As a result of this conviction I was convinced that every boy in a woodworking shop should know how to sharpen the edge of tools he found it necessary to use. I equipped two different shops with an oilstone under each bench, in a slide so that it could be pulled out for use and slid back under the bench when not in use.

Years have gone by since then and the oilstones, in spite of precept to the contrary, have been used too much in the center and have in some cases become so hollowed as to be almost useless. For some time I have been seeking information as to how to straighten the stones. I have tried grinding with the emery wheel and the grindstone, with little appreciable benefit.

A short time ago I was visiting a friend in Niagara Falls, N. Y., who is employed in the Carborundum plant. In the course of our visit he told me of the different processes in the manufacture of carborundum stones and incidentally mentioned how they cut their stones to size. He assured me that by taking some perfectly flat surface and sprinkling on sand and water and then laying the hollowed stone on it face down and revolving it I could grind my stones flat again.

The other day I tried the experiment and my efforts met with success. I took a piece of slate blackboard and laid it face up on a bench. Upon this I placed a piece of broken glass to take the wear and after sprinkling on some ordinary lake sand and water I started my grinding. The sand had to be renewed from time to time and plenty of water was used, but in about half an hour I had retrued a stone hollowed as much as an eighth of an inch in the center. Aside from being thinner, the stone is as good as ever and will last many years.

It seems to me that the job of straightening the oilstone on his own bench would be a good fill-in job for the boy who is held up for a short time with his next job, or late in the year when time is not sufficient to warrant the beginning of another project.



A CHART FOR TEACHING THE LAY OF THE CASE.

LAY OF THE CASE AND TYPE IDENTIFICATION

John F. Faber and Dean W. Conner, Erie, Penna.

The beginner in printing is soon called upon to learn the "Lay of the Case." This is necessary for both setting and distribution of type.

Both of these operations require the ability to identify a letter or figure from its appearance on a piece of type. In some instances, as in the case of the n, u, p, b, d, and q, the new student experiences considerable difficulty in distinguishing the letter he needs.

To overcome this difficulty and assist the student in learning the "Lay of the Case," the accompanying chart was prepared. It consists of the California Job Case, showing the letters as they appear in printed matter in the upper half of each rectangle, and as they appear on the type (*nicks up*) in the lower half of each rectangle.

This chart was made approximately 13"x25" with the type boxes in the proper proportion. The alphabet chosen was 36-point Roman. The absence of the English characters in the upper right hand spaces is due to the fact that they are usually missing from most type cases. These spaces are ordinarily reserved for brackets, parentheses, etc.

In the preparation of the chart the complete alphabet was printed on a clean tympan and then on thin white paper, which resulted in an offset as well as a regular printing. These letters were then cut out and pasted in place. The offset letters were utilized in showing the characters as they appear on type.

If this chart is placed near the type case where it can be easily referred to, it will be found a convenient and efficient assistant in "putting over" some troublesome lessons in printing.

BAND SAW FILING TABLE

J. D. Wilson, Los Angeles, California

The working parts of this table are two wheels placed at such a distance apart that the distance around the outer half of the wheels, plus twice the horizontal distance between the centers of them, will be about the same as the length of the ordinary bandsaw.

One wheel is made on a stationary axis, while the other has a supporting block made of a piece of hardwood. A slot in the table top and a bolt through the wheel supporting the block and slot, provides both end and turning motion.

A clamp about 12 inches long is made in which to tightly hold a section of the saw while filing it.

The same equipment will also work with an automatic filer by bolting the machine to the table, in place

SAW FILING TABLE.

of the clamp. Necessary adjustments will be required in the amount of space between the wheels and the table top, to conform to the automatic filer.

PENDULUM

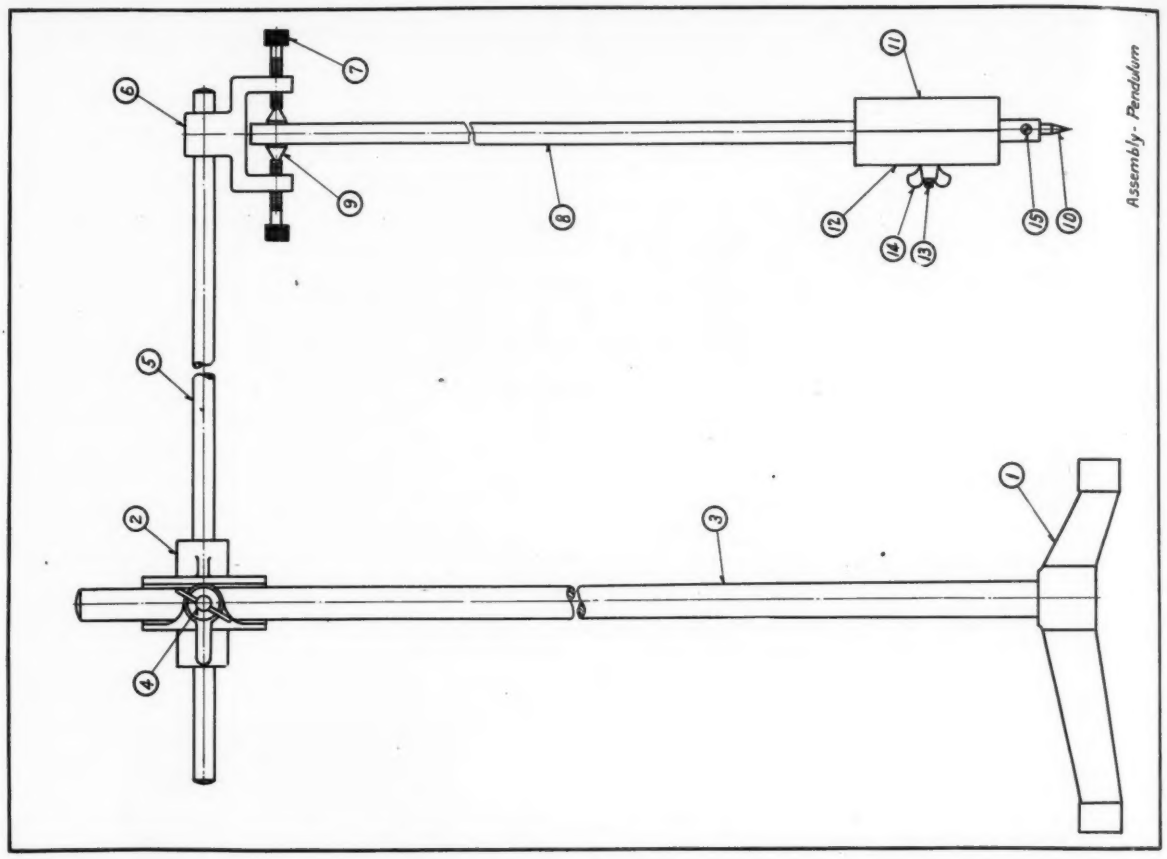
J. A. Miller, New Kensington, Pa.

The "seconds" pendulum is valuable for experimental purposes in the laboratories of the science department. It is called a "seconds" pendulum because its vibrations are used to cut off seconds of time. In this particular case there is a one-half vibration every second.

A mercury cup is used in connection with the experiments, and is connected up with either a door bell or automobile horn. The tip (item No. 10) of the pendulum cuts through the mercury, making just enough contact to ring a bell or blow a horn. Adjustment is made by use of the adjusting screw, item No. 7.

By using the pendulum in this manner it is possible to mark off time in seconds.

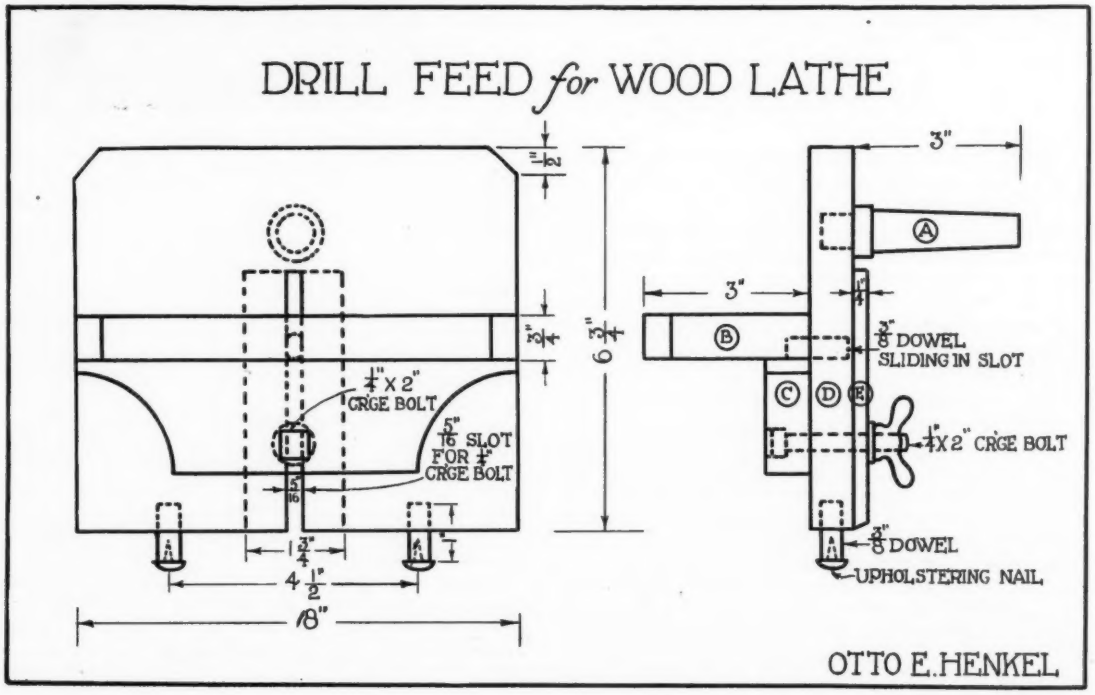
Another use for the pendulum is in a field experiment where on different days the travel of sound is measured in feet, by observing the point of pendulum as it passes through mercury and the sounds of the bell or horn.

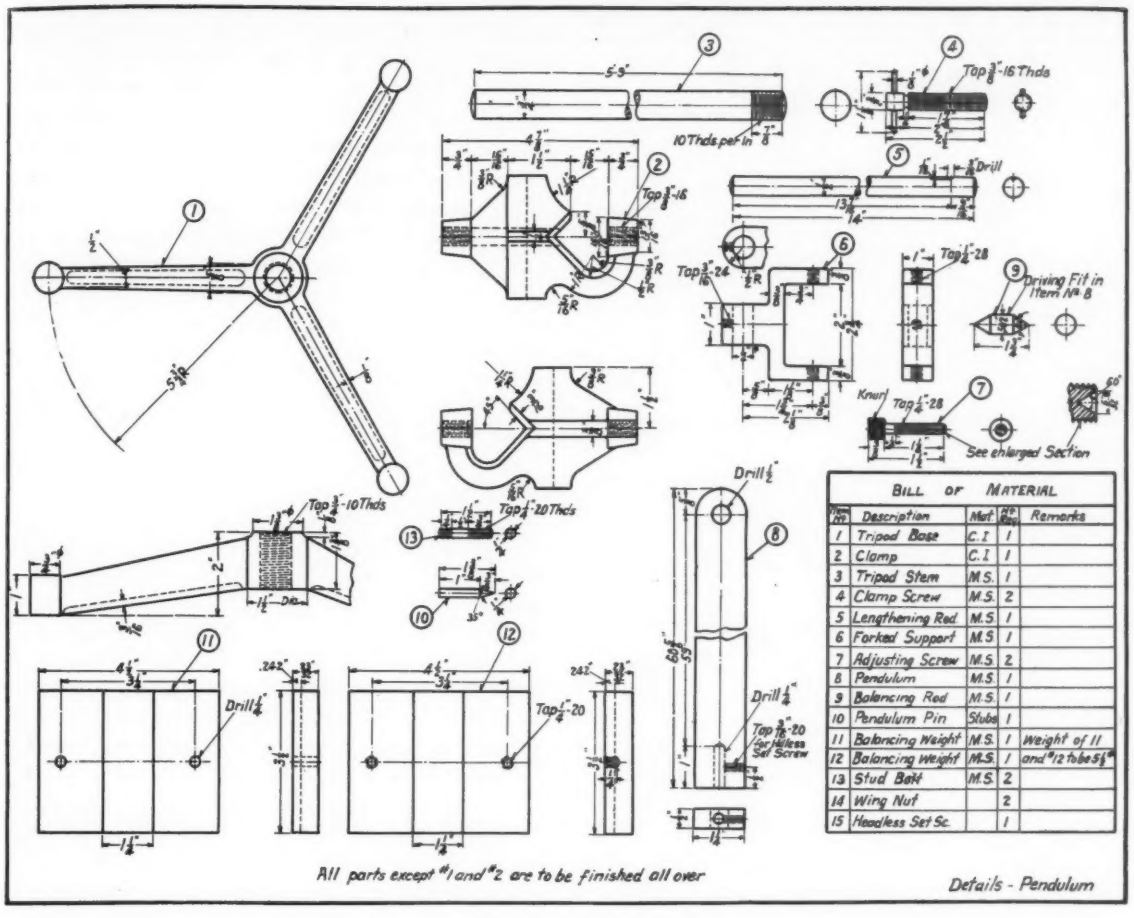


ASSEMBLY DETAILS OF PENDULUM.

The pendulum is very easily constructed and is well within the scope of work that a ninth grade student should be able to handle.

Items Nos. 1 and 2 are standard laboratory equipment and patterns of these two pieces, which are the only ones to be made of cast iron, will not be necessary. The only machine work necessary on No. 1 is to drill and tap ¾"—10 threads. This allows a bar ¾" diameter to be used, thus doing away with swaying that would result from the lighter bar ordinarily used.





BILL OF MATERIAL

Item No.	Description	Mat'l	No. Req'd	Remarks
1	Tripod Base	C.I.	1	
2	Clamp	C.I.	1	
3	Tripod Stem	M.S.	1	
4	Clamp Screw	M.S.	2	
5	Lengthening Rod	M.S.	1	
6	Forked Support	M.S.	1	
7	Adjusting Screw	M.S.	2	
8	Pendulum	M.S.	1	
9	Balancing Rod	M.S.	1	
10	Pendulum Pin	Stub	1	
11	Balancing Weight	M.S.	1	Weight of 11 and #12 tube 5½ lbs.
12	Balancing Weight	M.S.	1	
13	Stud Bolt	M.S.	2	
14	Wing Nut		2	
15	Headless Set Sc.		1	

DETAILS OF PENDULUM.

Item No. 9 is driven into the ½" hole in item No. 8. The ends of the adjusting screws (item No. 7) are centered or "dished out" as shown in enlarged section, so that pendulum can be raised or lowered as desired, and yet retain a perfect bearing.

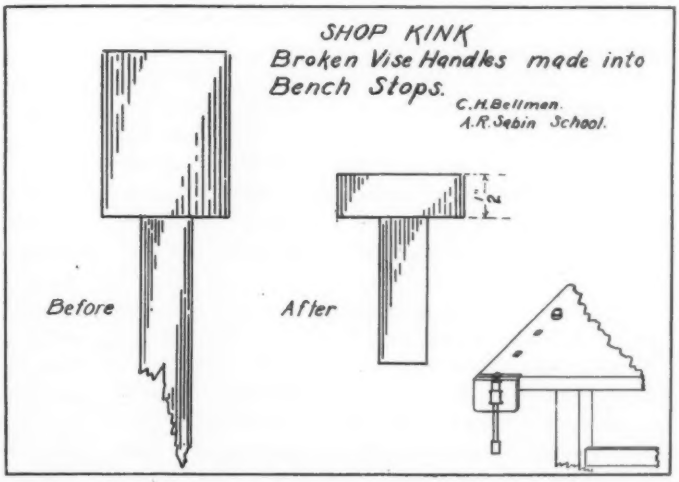
The weight of the balancing weights (11 and 12) was fixed at 5½ pounds; but this is variable, owing to the desired location of the center of gravity.

DRILL-FEED FOR WOOD LATHE

Otto E. Henkel, Wayzata, Minn.

Many Manual Training shops who have no power drill press may have a wood lathe. With the help of the drill-feed, most of the drilling in wood and iron can be done on the lathe.

The drill-feed was made in less than an hour's time, of material found in any manual training shop. It slides into the tail stock of the lathe as easily as the dead center. Piece A is turned out of a piece of straight grained hardwood. It is turned into the shape of the dead center and is then mortised into piece D, any hard wood. Piece E is glued onto piece D with the grain running lengthwise and opposite to the grain of piece D. A slot is cut, as shown in the drawing, in which a ¼" bolt will slide. A dowel is glued into piece B and then is filed flat on two sides until it also fits the slot. Pieces B and C are doweled together, forming a bracket shelf which can be adjusted at various heights by means of the carriage bolt whose head is mortised into piece C. Finally two ⅜" dowels are glued into the bottom of piece D and they must be made long enough to touch the bed of the lathe when the drill-feed is in place. The upholstering nails are driven into the dowels to make the drill-feed slide more easily along the bed of the lathe.



A SUGGESTION FOR USING UP BROKEN VISE HANDLES.
By Mr. C. H. Bellman, Chicago, Ill.

INDUSTRIAL-ARTS MAGAZINE

E. J. Lake S. J. Vaughn

Editors

WHEN YOU CHANGE POSITIONS

There is a great deal of changing positions in this country, far too much of it. The time should, and probably will, come when a teacher may look with some certainty upon a single position as a life career, if the position holds forth sufficient attraction and inducement.

But as it is now, the teaching business is somewhat like a progressive party—you tarry a while in one place and then move on. Accepting this as true, let us consider some of the problems that face the teacher who has just moved to a new position.

First of all, he will be under the very closest scrutiny. Every step and every act and every remark will become the subject of conversation of both students and patrons. Oftentimes, numerous friends of a former holder of the same position will be anxiously waiting for some chance to criticise or complain.

The new teacher in a position, therefore, should be scrupulously careful never to criticise the work, conduct, personal characteristics, or professional preparation of his predecessor. It is sometimes difficult for a great many teachers to follow this piece of advice. Many times there have been unfortunate shortcomings in the predecessor's life, work, preparation, or some other matters that are very tempting of unkindly remarks. When a teacher criticises his predecessor, it is interpreted by intelligent people as a species of egotism which manifests itself in the comparison of himself with his predecessor much to the discredit of the predecessor. Any such criticism, therefore, always reacts against the person who offers the criticisms.

Another tendency that is almost impossible to inhibit is the tendency on the part of the new teacher to tell those in his new location what a wonderful place it was which he left to take the new position—and what wonderful success he had achieved there. Such bits of information should be permitted to come by the indirect route rather than by the personal testimony of the teacher to his own merits. No sane teacher will compare a new place to the old and familiar one to the disadvantage of the new city, school, equipment, or students.

The best advice for a teacher who has just taken up a new position is this: Go into the new position enthusiastically, whole-heartedly, with the expectation that it will be all that the heart could desire. Accept everybody as a friend. Let others do most of the talking, especially about the problems of the position. Make haste slowly. Don't be a sensationalist. Don't strive for publicity; it will come in proper proportion to your desserts. Get the confidence of the students and the public and the teaching force. Be a *community man*, participating in every worthy enterprise as a *helper* at first certainly, and later your leadership may be in demand. After you have won complete confidence, then you can practically have your own way, and there will have been no need whatever of the criticism, comparison, loose talk, and egotistical references which have been mentioned as the things especially to be avoided.

HAS A REACTION OCCURRED IN THE ART WORK?

In a number of recent art exhibitions, there was a noticeable predominance of portraiture and paintings of various descriptions, and a corresponding scarcity of designs and decorative effects. Even the designs that were offered were of the extremely naturalistic variety. Much of the applied design was the kind that harked back to flower and fruit decorations of china and glassware common a quarter of a century ago.

It is just possible that such exhibits were not representative of the present tendency in art education in the schools. It certainly is to be hoped that they are not representative. It took a long, hard struggle to get the art work in our schools to the plane of practical design for definite purposes. Only in recent years has the industrial phase of art made any headway in the schools, and it would seem nothing less than tragic to have the art work revert to the earlier type which was both useless and inartistic.

THE END OF THE VETERANS' BUREAU

The announcement comes from Washington that the work of the Veterans' Bureau is completed and the task of re-educating the disabled service men is to be discontinued. This announcement comes as a sort of voice out of ancient history. It recalls the tragedy that made such a service necessary. It brings back to mind the elaborate attempt in this country, following the examples of other countries, to recompense the men in some degree for the privations, the suffering, and the disabilities they underwent by trying to fit them for life after the war.

It was a noble thought and a worthy attempt. It was not always wisely and worthily done, but that was true of most of the attempts made during the war. A great many men were saved from themselves and from despair and bitterness by the educational efforts in the army, navy, and marine hospitals, although such efforts may not have been very effective as educational efforts.

Since the close of the war, a great many service men found facing them what they had never dared dream before, namely, the opportunity to get a college education. It can be said to the credit of many of the institutions of higher learning that for once at least they adopted a most generous and sensible policy of waiving rigid entrance requirements and of admitting the service men to any courses from which there was any hope of their securing some profit. To the honor of a considerable number of service men, it can be said that they did themselves a distinct credit in the courses which they undertook.

Having offered their lives for their country, it certainly was as little as the service men could expect, that they should have some chance to get back into normal civil life with as little handicap as possible. It is one of the few bright spots and happy thoughts in the whole gruesome business of war that the government, even though rather blunderingly, should spend large sums of money and employ skilled teachers and directors of the work in the attempt to bring a little ray of sunshine into the broken and darkened lives of those who fought its battles in its dire need.

A DUTY OF THE SHOP TEACHER

Some manual arts teachers complain of the lack of respect shown them on the part of the old-fashioned academic teachers when, in fact, they are responsible in large part for the attitude which academic men, the principals, and even the superintendents take toward all shop work and toward the entire industrial arts and vocational departments. We have frequently heard the remark, "Well, he is a manual arts instructor, and he can't get into a professional attitude toward his work," or "He doesn't mix with the other teachers and take an active interest in general school activities."

It is a very real duty of the shop teacher to take an active part in every general undertaking of the school in which he is teaching. He is an integral part of the school system and the work which he is giving is an integral part of the education of every boy. It seems superfluous to say that it is his duty to defend and promote the subject which he is teaching, by doing his instructional work so well that principals and supervisors, and even teachers recognize its worth. But it is also his duty to advocate and advertise the advantages of shop subjects and to make suggestions and correlations of his instruction with every other department of the school.

To illustrate: The teacher of English will have no difficulty in finding topics for themes or essays if the shop teacher suggests subjects which are related with current shop projects which are "going over" with much enthusiasm. The instructor in mathematics will frequently welcome problems illustrating real situations that have arisen in the print shop, in the machine shop, in the automotive shop, etc. The librarian will appreciate help in selecting new books or in receiving hints concerning reading material in which the shop classes are particularly interested. Even the principal will look with new appreciation to the shop teacher if the latter has usable suggestions to make for an occasional assembly hall speaker, or a novel assembly program.

It takes tact, of course, for the shop teacher to make suggestions to the older and more conservative of the academic instructors, but the attitude of helpfulness and of constructive educational service will never go unappreciated.

RAISING STANDARDS

Standards in school work may never remain fixed. Like the civilization they typify, they must go up or down. They have been going steadily upward within the experience of each successive generation of teachers.

As a result, or perhaps as a reason, teachers are going back to school this fall with a little better plan of work and a little better way of presenting that plan.

Last year the teacher made certain discoveries. The pupils seemed to mark time and even shirk some exercises, and take a live interest in doing other things. Of course it is not possible to have every one in a class "up on their toes" all of the time but it is feasible to substitute interesting exercises for dull, uninteresting ones, without changing the purpose of the exercise. We did that when we quit making a series of wooden joint exercises and a series of line exercises in drawing.

The industries present such a variety of interests that involve similar precepts and principles that it is disparaging rather than commendable, for a teacher to do just the things done elsewhere.

No one routine of exercises can possibly fit the conditions of many schools and teachers. The industrial-arts teacher has a unique opportunity for originality among teachers.

School work should not be graded entirely on either quality or quantity. The standard of excellence should be based on a fair compromise between quality and quantity. The best results are not secured by spending unlimited time on a part of the program and neglecting a fair variety of interests.

That complete set of furniture made with near-trade skill by one boy of the class did not probably do him or the teacher full school credit. The teacher whose class makes the greatest variety of things in the greatest variety of materials may not have the best course or deserve the most credit.

There must be a definite program; there must be some compromise with the definite program. Standards will be raised in some cases by doing the same or even less work better than last year; in other cases by doing more work as well or better than last year. Standards must be raised for standards must go up or down and they must not go down.

The schools are growing, progressive institutions.

HARD WORK ROAD TO SUCCESS

The change from school to the work of life is sometimes very abrupt. To those who have been employed part-time in some industry perhaps it comes as less of a shock, but to most of us it means new adjustments, new habits of living, new things to think about and new problems to worry over.

Each of us is endowed with certain inherent abilities, abilities to encounter problems and to solve them; and yet all of these abilities function properly only when applied properly. In the work of the world which you will encounter, as you go forward, I trust that you may use your own equipment to the best possible advantage, that you will keep in mind that ability alone without hard work accomplishes little and that ultimate success comes to him who keeps on working.—*L. A. Emerson, Principal, Newark, N. J.*

How Shall We Mill It?

Typical Ways of Handling Various Milling Jobs

Howard Rowland

The Importance of Milling

In the great majority of machine shops the milling department is one of the most important departments This is especially so in shops that manufacture a large number of duplicate parts. In such a shop any reduction of the time required in milling operation is an important item of economy and justifies the management in spending some time and effort to determine the best way in which such a milling operation might be carried on. This refers not only to shops where thousands of similar pieces are made every year, but applies equally well to the ordinary manufacturing machine shops where lots of twenty or thirty are the rule and large lots are the exception.

When we have to do a milling operation on a piece of work, we know, of course, that we must have a suitable cutter and some device to hold the piece. If the number of pieces justifies it, we make a special holding fixture, and perhaps a special cutter, and then we are inclined to think that we have done all that can be done.

However, in a large number of cases a more thorough examination will reveal the fact that the operation can be done in various ways.

The following illustrations have been selected to represent various types of milling which are used throughout our industrial plants today. In most cases it is a comparatively simple matter to determine which type of milling should be employed, but frequently prejudice on the part of the user of the equipment causes one method to be adopted rather than another.

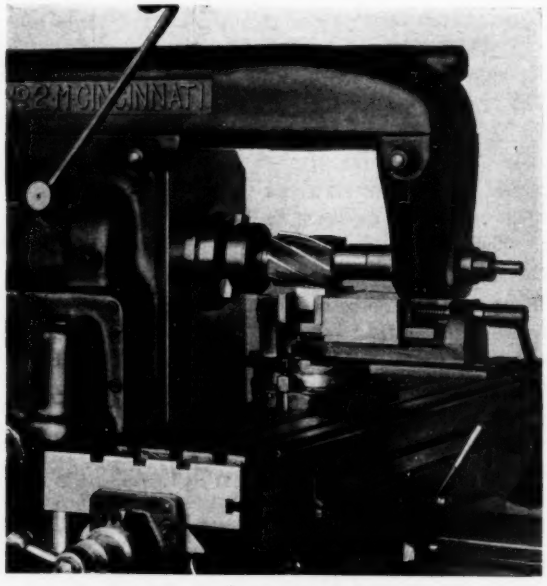


FIGURE 1. SINGLE VISE MILLING.

MACHINE: Plain milling, removing ⅛" stock from steel resting block. CUTTERS: 3-½" spiral milled. OPERATION: Mill top. MATERIAL: Low carbon steel. SPEED: 82 R.P.M. TIME PER PIECE: .195 min. FEED: 7⅜".

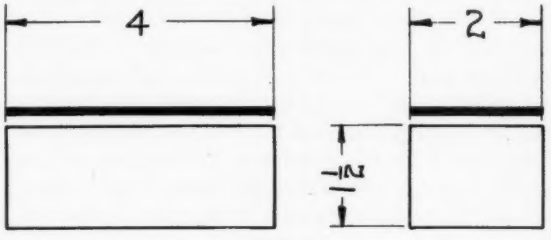


FIGURE 1A.

Determining the Right Method

The cost of the operation is a determining factor. There are other points, however, which enter into the final selection of the method, such as safety of operation, cost of special fixtures, cost of labor to operate machine, cost of machine, the question of upkeep, of floor space, of work spoilage, of better finish and of dimension limits—all of these must be considered. Usually the final method is a compromise, for very seldom is it possible to obtain all of the desired elements in a particular method.

Examples of Various Methods

The following examples, which are accompanied by illustrations and sketches of the pieces which are being milled, are taken from installations in leading industrial plants. They represent milling not only in the larger plants, such as the automobile industry, but are taken from some of the smaller shops and tool rooms in order to cover thoroughly all types of milling. It will be noticed that both the knee and column type machines and the fixed bed type machine have been used, and that both hand and automatic controls have been utilized.

1. Single Vise

This is the simplest type of milling where a standard swivel vise is mounted on the table of the machine and a simple piece of steel is held for the cut. Thousands of simple jobs like this are handled daily. For jobs of this kind the feed and speed of the machine have to be determined frequently by a cut-and-try method and for this reason it is very desirable to have a machine which is easy to control, and on which the feed and speed changes can be made quickly and without loss of movement or time.

2. Two Vises or Fixtures

When two pieces are mounted on the table of the machine and held either by vises or special fixtures, as shown in illustration No. 2, we begin to take steps toward the cutting down of idle time and toward getting the machine to work productively the greater part of the time. Two fixtures are mounted on the table of the machine, each holding a piece. While piece No. 1 is being milled, the finished piece is taken out of fixture No. 2 and a new one inserted. While piece No. 2 is being milled, the finished part is taken out of fixture No. 1 and a new piece inserted. At the completion of the cut on piece No. 2, the table is lowered by the operator's left hand and is rapidly returned to its original position by power quick traverse, controlled by the lever in the operator's right hand. The reason for lowering the table is obvious, since the work must clear the cutter when rapidly returning over the finished piece No. 2 and rough piece No. 1. The table is, of course, raised to its original position before again starting the cut. This method is frequently used where spiral cutters are employed, requiring the table to be fed only in one direction. The use of two fixtures gives the advantage of saving the loading time, for while one piece is being milled, the other is being loaded. Power quick traverse to the table cuts down the idle cutting time and brings the table back to the position in the quickest possible time and with the least effort to the operator.

3. String Milling

When the pieces are small and when the holding units are very cheap and simple, the string type fixture shown in this illustration is frequently employed. The operator loads in front of the cutter and removes the finished pieces from the rear of the cutter. The idle time consumed, therefore, is that necessary to return the table to the original starting position and to load just enough pieces in the fixture so that the cut can be started. The disadvantage of this type of milling is the fact that the operator is compelled to work too close to the cutters, which is not at all safe.

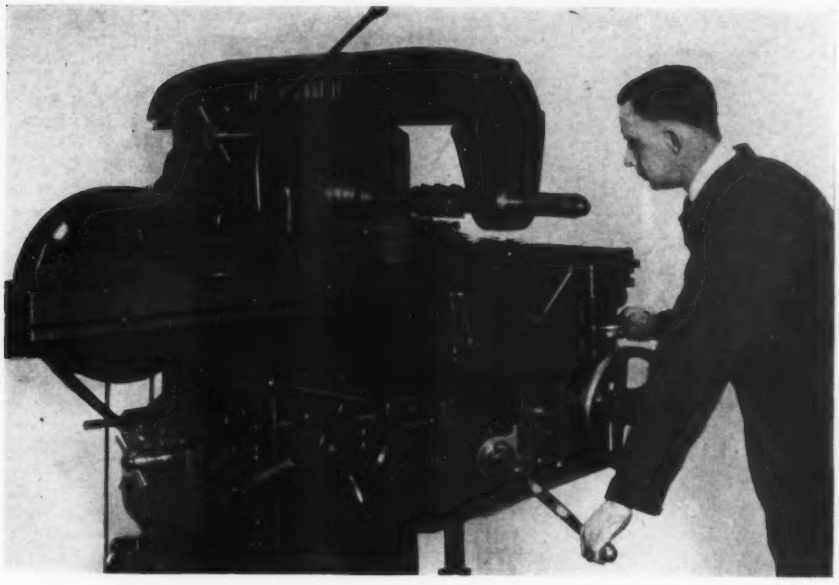


FIGURE 2.
USE OF TWO VISES OR FIXTURES.

MACHINE: High power, removing ⅛" stock. PART: Clamp on a 10" dividing head. CUTTERS: 3" diameter high speed spiral milled, 6" wide. OPERATION: Mill sides. MATERIAL: Cast iron. SPEED: 94 R.P.M. FEED: 28.2 per min.

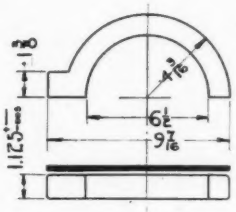


FIGURE 2A.

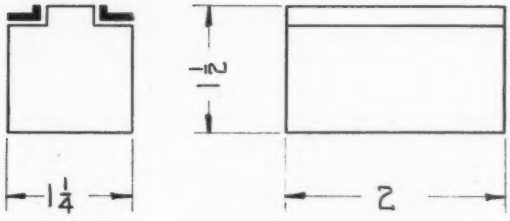


FIGURE 3A.

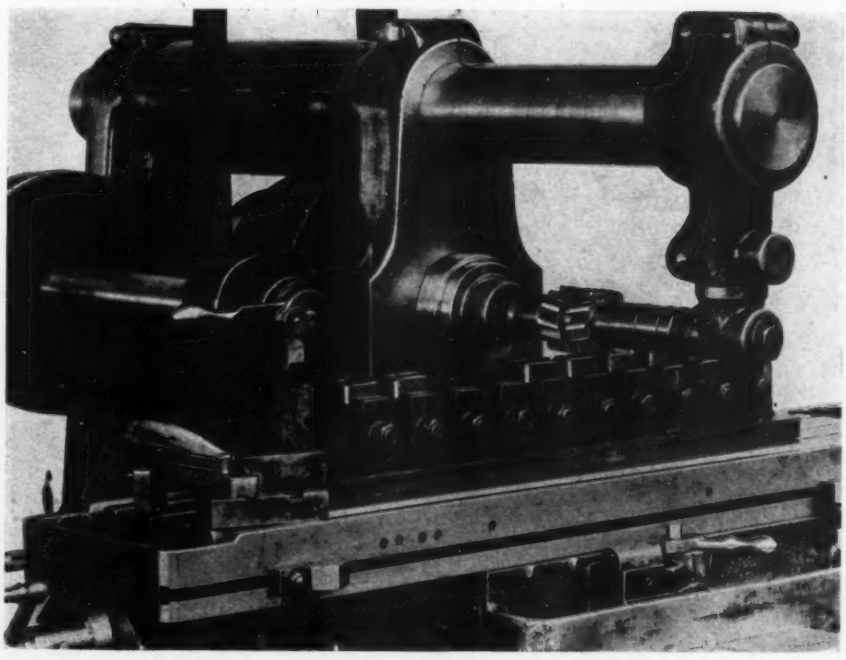


FIGURE 3.
STRING MILLING.

MACHINE: Cone, removing ¼" stock. PART: Tongue strip. CUTTERS: 2—4" diameter spiral mills with mill teeth. OPERATION: Mill tongue. MATERIAL: Steel forging. SPEED: 67 R. P. M. TIME PER PIECE: .6 min. FEED: 5".

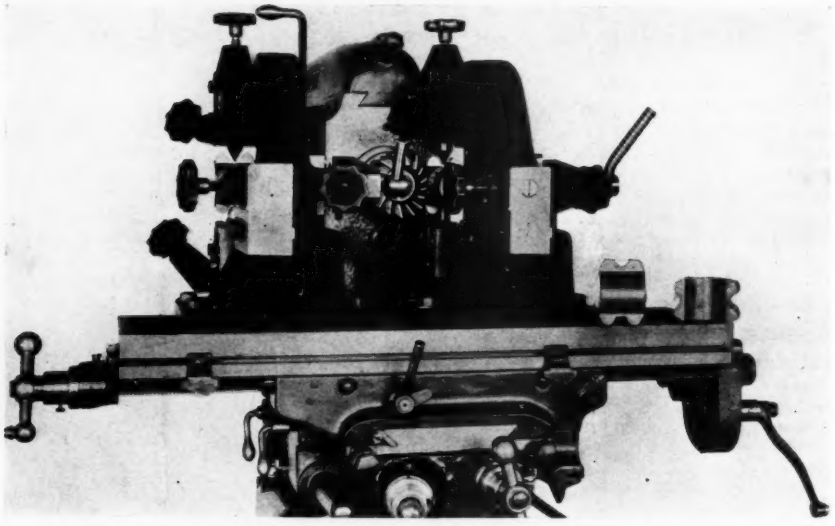


FIGURE 4. RECIPROCATING MILLING ON A HORIZONTAL TYPE MACHINE.
MACHINE: Plain miller, removing 1/64" stock. PART: Connecting rod and connecting rod cap. CUTTERS: 1—6" diameter shell end mill. MATERIAL: Drop forge steel. SPEED: 61 R.P.M. TIME ELAPSED FOR A FULL SET OF ONE ROD AND CAP: 1.05 min. FEED: 7½" per min.

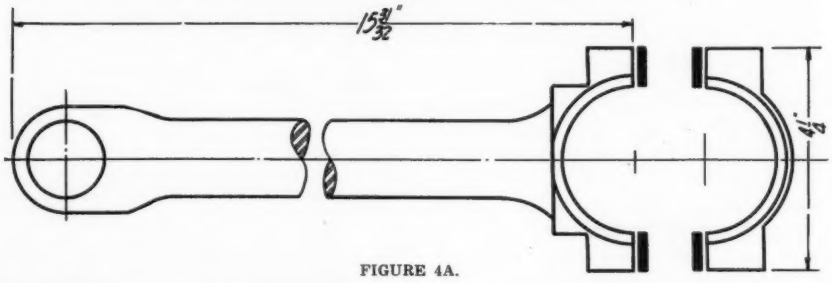


FIGURE 4A.

4. Reciprocating Milling on a Horizontal Type Machine

A piece is held in a fixture mounted on each side of the cutter as shown in the illustration. The operator loads while milling and thus saves idle time. In this particular type of milling the direction of the cut on one piece is up and on the other piece is down. The small table travel between the pieces makes the loss of time very small, and for that reason this type of milling is frequently employed to advantage. The movement of the table on the type of machine shown in the photograph is by hand, using the crank at the right end of the table.

The movement of the table in this operation is controlled automatically by dogs which are properly set in the two front table tee slots. Here again we have reciprocating milling, this time on a vertical machine with two special fixtures holding the part, one on each side of the cutter. While one piece is being milled, the operator removes the finished piece from the other fixture and inserts a new piece. The dogs controlling the automatic milling cycle are set so that the machine automatically trips out of the feed rate at the completion of the cut and returns at a power quick traverse rate and automatically trips to the feed rate for milling the other piece. The operator repeats the unloading and loading while milling. This is a very desirable method for many parts and is highly productive, especially when this automatic feature of the machine is employed. All that the operator has to do is to load and unload—the machine does the rest.

(To be Continued.)

SHOP COURSES IN SUMMER SCHOOLS FOR VOCATIONAL TEACHERS

A. Conery, Milwaukee, Wis.

The summer school catalogs from 179 normal schools, colleges, and universities in the United States, which offered teacher-training courses during the summer of 1926, reveal some significant figures relative to the emphasis placed on the various shop courses in the training of shop teachers.

It is surprising to find that some of the newer types of shop work are not in evidence, while some of the earlier types predominate more strongly than they should. For illustration, in the 104 schools which list shop courses for teachers, there were only eight courses in auto-mechanics, three in farm mechanics, three in foundry, none in bricklaying, one in concrete, none in oxy-acetylene welding. There were 68 courses called woodworking, 62 named "manual training," and 24 in forging. "Manual training" and woodwork made up a third of all the shop courses in the entire country.

The finding raises the old question of educational leadership. Are the colleges, and especially the summer schools, offering the courses that the country really needs, or are they clinging to the traditions of the past? The table below shows what was actually offered by 104 of the 179 summer schools whose summer session catalogs were studied:

Name of Courses	Frequency Course is Offered	Percentage of Shop Courses
Bench woodwork	130	28.9
Drafting	65	14.4
Cabinet making	46	10.34
Carpentry	42	9.4
Pattern making	24	5.37
Machine shop practice	41	9.2
Forging	24	5.37
Auto-mechanics	8	1.8
Electricity	32	7.12
Printing	20	4.5
Sheet metal work	17	3.6
Total shop courses	**449**	**100.00 per cent**
Total of woodworking courses	**242**	**54.04 per cent**

Over half of the work offered in the industrial education courses was woodwork and over half of that was benchwork. Is that the proper emphasis? Farm mechanics and foundry were combined with machine shop practice, and still they only represent 9.2 per cent of the

courses. Less than one-tenth of the summer school shop courses were in the machine shop with its related trades. Outside of the school shops, out in the industries themselves, we find that 27 per cent of all the workers are in the metal industries, and only eleven per cent are in the woodworking industries. Are the schools placing the proper emphasis on their shop courses?

Why do the newer types of shop work fail to be recognized? Is it simply because the shops are already equipped for the old courses? Are the schools really meeting the needs of the community? Or, are the teachers of the newer subjects poorly prepared in the science and act of teaching, so that they seek courses in psychology and pedagogy, rather than shopwork? Are there not numerous problems in the situation which deserve study and solution before it can be said that the teacher training institutions are adequately meeting the requirements of the vocational schools for new teachers and for the improvement of men already in the service?

THE EXTENT AND CHARACTER OF SHOP WORK IN THE HIGH SCHOOLS OF CHICAGO

The vastness and the variety of the problems of organizing and administering the shop work in the Chicago high schools is indicated in the annual report of Mr. A. G. Bauersfeld, for the year ending June, 1926. The entire technical studies of the Chicago high schools are undergoing a change due to the organization of junior high schools and the reorganization of the senior high schools on a three years' basis.

A further form of reorganization is being carried on at the same time to centralize the specialized technical shop work, and to minimize it in the co-educational schools where academic courses strictly predominate.

The work of the shop departments has grown enormously during the past year. In the direction of improved and better shop work, complete equipments have been installed in two of the large technical high schools, the Crane and Tilden, and increased shop facilities were added to the Carl Schurz, the largest co-educational high school.

Another development has been the reorganization of the work in the senior high schools due to the gradual taking over of the ninth grade by the junior high schools. Attainment tests have also been given for the development of an understanding of what is required of students trained in the various skill and learning units.

The general efficiency of the technical departments in the high schools has been improved through special training courses for teachers who possess mechanical ability but who need assistance in organizing their work into teaching units and in pursuing good classroom methods.

Increased efficiency has also been attained through the greater use of the facilities offered. The Crane and Tilden high schools offer highly specialized courses in technical work for the west and south sides, and complete equipments in woodworking, patternmaking, foundry practice, forge practice, machine shop practice, electrical shop testing, sheet metal work, auto-mechanics, printing, mechanical drawing, machine drawing and architectural drawing are in operation.

A good idea of the popularity of the courses and of the distribution of the pupils in shop work may be obtained from a study of the enrollment figures. Statistics compiled by the director of high school shop work show that the total number of boys in the high schools is 32,970. Of this number, 15,053, or 2.13 per cent, are taking shop work, and 17,274, or 1.88 per cent, are taking shop drawing. The largest number of students in shop work are enrolled at the Crane, Lane, and Tilden high schools, while smaller numbers are taking the work in the Calumet, Hyde Park, Medill, Morgan Park, Parker, Tuley, and Waller high schools.

Of the total number in drawing courses, the largest number are found in the Austin, Harrison, Lane, Schurz, and Tilden high schools, while the smaller numbers are in the Calumet, Hibbard, Marshall, McKinley, Morgan Park, Medill, Parker, Phillips, Tuley, and Waller high schools.

The largest percentage of pupils in shop courses is noted in woodworking, with 35.7 per cent of the pupils taking the work. The next highest percentage is in electrical construction, with 17.6 per cent enrolled, and the third highest is machine shop work, with 12.8 per cent

Industrial Arts

Subjects—	Pupils	Per Cent[1]	Teachers
Auto-mechanics	1,256	8.4	19
Electrical work	2,660	17.6	31
Foundry work	1,022	6.8	14
Forge work	1,080	7.1	14
Machine shop	1,940	12.8	26
Printing	1,376	9.1	26
Sheet metal	346	2.3	5
Woodworking	5,373	35.7	58
Total	15,053	99.8	193

Graphic Arts

Subjects—	Pupils	Per Cent[1]	Teachers
Architectural drawing	1,561	5.1	13
Mechanical drawing	15,713	51.3	65
Freehand drawing	13,327	43.5	58
Total	30,601	99.9	136

Arts Craft

Subjects—	Pupils	Per Cent[1]	Teachers
Jewelry	317	18.1	5
Pottery	486	27.7	7
Stage Craft	178	10.1	4
Weaving	773	44.5	5
Total	1,754	100.4	21

[1]This column of percentages has been added to Mr. Bauersfeld's tabulation.

of the pupils taking the work. In shop drawing, the largest percentage of pupils is in mechanical drawing, with 51.3 per cent of the pupils enrolled. The next highest percentage is in freehand drawing, with 43.5 per cent of the pupils enrolled.

The work of reorganizing the technical courses for the junior and senior high schools has been begun by the special committees in charge of the work, and the proposed program involves the inauguration of (a) a general course to prepare high school students for citizenship, without regard to college entrance or a specific vocation; (b) a program intended to meet the needs of students who expect to enter a classical course in college; (c) vocational courses for students expecting to enter industry directly from the high school; (d) opportunity courses for the varying interests and capacities of students who do not give promise of satisfactory high school completion, and (e) other special courses stressing technical subjects, commercial work, science, etc., for those who expect to take up similar lines in college.

With the gradual elimination of the ninth grade in the senior high schools, it will be the aim to transfer the woodworking, sheet metal, elementary electrical construction, 1-A and 1-B mechanical drawing, weaving, pottery, arts craft, and stage craft shops to the junior high schools.

For the coming year it is planned to introduce three-year technical courses in each of the following schools where the equipment is adequate and the demand sufficient to economically maintain the work: Crane, Lane, Tilden, Austin, Schurz, Senn, Harrison, Lindblom, and Bowen. Principals of these schools will fill up classes of the standard technical shop courses, and will then eliminate other technical subjects in which the attendance is not equal to the standard set, which is one hundred pupils per day in each shop.

In the academic high schools, namely, the Englewood, Hibbard, Parker, Calumet, Morgan Park, Phillips, and Fenger, the number of courses will be limited to electrical construction, printing, auto-mechanics, and two years of mechanical drawing. These courses are for general cultural training in one or two practical subjects. In addition, they will take care of the motor type boy who is compelled to attend school until 16 years of age and who desires an opportunity to select courses which appeal to him. Pupils wishing to further specialize beyond the facilities offered, will be advised to transfer to schools equipped to offer standard courses.

In the remaining academic high schools, such as Marshall, McKinley, Tuley, Medill, Waller, Hyde Park, and Phillips, it is believed that two years of mechanical drawing and one year of shop work are sufficient to meet the demands for an elective technical course. Technical facilities in these schools will not be extended until there is a sufficient demand so that the work may be efficiently and economically conducted.

The new policy in force in the academic high schools has come about through conditions of the last fifteen years, and as a result of a small demand for the technical courses in the co-educational high schools. It will mean a better distribution of the courses, increased use of the shop and drawing facilities, and a more efficient and economical administration of the shop work.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

ELECTRIC HOIST TOY

Thomas L. Lawson, Newark, N. J.

The electric hoist provides an interesting problem for the seventh or eighth grade boy. It has in its construction the use of the tools in the shop and introduces the use of other materials besides wood, such as bolts, screw eyes and brass. A few of the elementary principles of electricity are introduced by the use of the dry cell and the electro magnet.

The base of the hoist consists of a piece of basswood 7/8"x7"x12" with a 1/4" chamfer. Holes are bored in the base with a 3/16" drill, 2 1/2" from the edges and 1 7/16" in from the ends. These holes are countersunk through which four 1 1/4" No. 10 F. H. wood screws are driven to hold the axles in place. The axles are made of 7/8" basswood as shown and have a 1/8" chamfer.

The shelf which supports the dry battery is of basswood, 1/4"x3"x8", fastened with 1 3/4" nails even with the bottom of the axles.

The parts through section A-B consist of three pieces of wood as shown on the drawing. The 7/8"x1 3/4"x2 1/2" piece is nailed and glued in place first, 1/2" from the chamfer, the other two pieces spaced 1 3/4" each side of the center piece and 1/2" from chamfer.

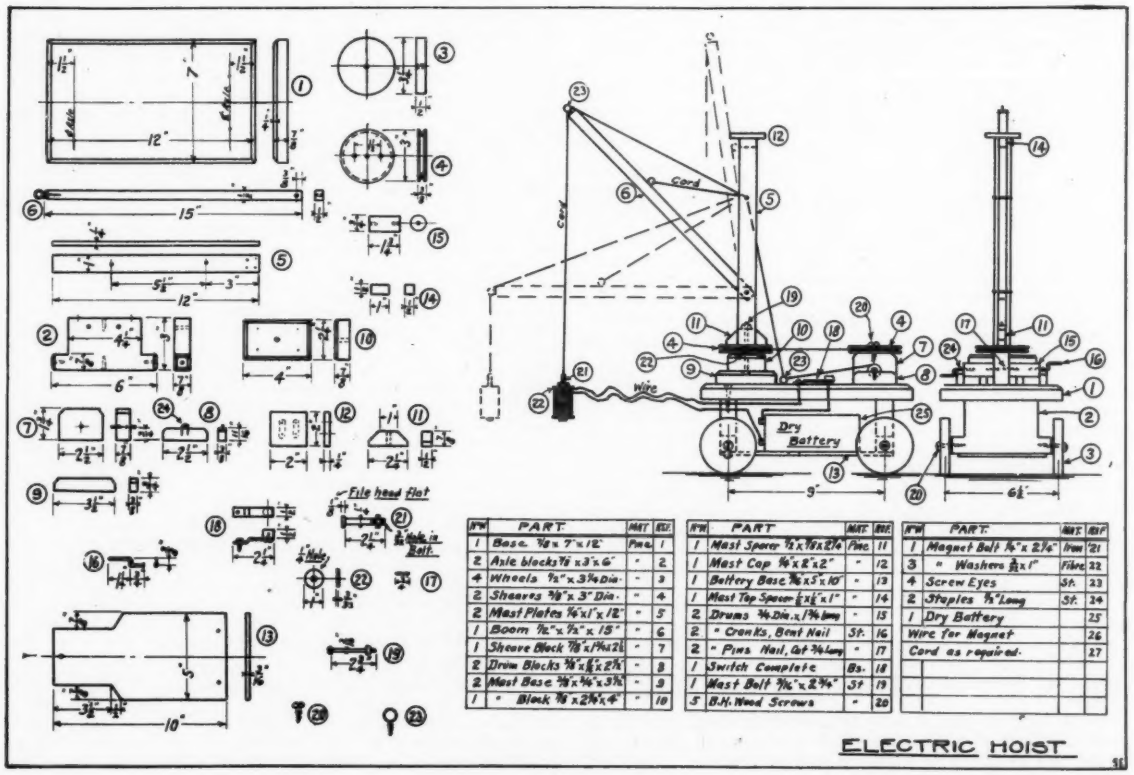
The parts through section C-D consist of two pieces of wood 3/8"x1 1/4"x3 1/2", nailed 1/2" from edge and 1" from end. The cross piece on which the upright of hoist turns is 3/8"x2"x4 1/4", having a 1/4" chamfer. This piece is fastened with four 3/4" R. H. blued screws so that it can be taken off if desired.

The upright of the hoist consists of two 1/4"x1"x12" pieces of wood, having one 1/2"x1/2"x1" and one 1/2"x1/2"x-2 1/2" nailed in between at the top and bottom, to form a 1/2" space for the projecting arm to fit in. A piece of wood 2" square and 1/4" thick is glued and nailed on top as shown. After the upright has been put together it is then fastened to a wheel 3" in diameter by means of 3/4" R. H. blued screws. The wheel has a groove filed around the center so the cord will not slip when wheel is turning. A 1/4" hole is then bored through the wheel and the bottom of the upright through which passes a 3/16"x1 1/2" R. H. stove bolt, a 3/16" iron washer being placed between upright and base, to prevent friction between base and upright.

On the upright, 2 1/2" from wheel a 5/32" hole is drilled through which passes a 1/8"x2" cotter pin, which holds the projecting arm in place. A 1" No. 18 F. H. nail is driven into the upright 2" down from the top, over which a cord is passed to lower and raise the arm and a second cord to lower and raise the magnet.

This arm is 1/2"x1/2"x15", having a 1/8" chamfer at one end and has a 1/8" hole bored at the other end for the cotter pin to pass through. One No. 1214 screweye is driven in the chamfered end and another screweye 4" from the chamfered end.

The drums on which the cord is wound consist of two pieces of 3/4" dowell 1 3/4" long. A 2" finishing nail is



No.	PART	MAT.	REQ'D
1	Base, 7/8 x 7" x 12"	Pine	1
2	Axle blocks 7/8 x 3" x 6"	"	2
4	Wheels 1/2" x 3 1/4 Dia.	"	3
2	Sheaves 3/8" x 3" Dia.	"	4
2	Mast Plates 1/4 x 1" x 12"	"	5
1	Boom 7/16" x 1 3/4" x 15"	"	6
1	Sheave Block 7/8 x 1 3/4 x 2 1/2	"	7
2	Drum Blocks 7/8 x 1 1/2 x 2 1/2	"	8
2	Mast Base 1/8 x 1 1/4 x 3 1/2	"	9
1	" Block 7/8 x 2 1/2 x 4"	"	10

No.	PART	MAT.	REQ'D
1	Mast Spacer 1/2 x 1 3/8 x 2 1/2	Pine	11
1	Mast Cap 1/4 x 2" x 2"	"	12
1	Battery Base 7/8 x 3 1/2 x 10"	"	13
1	Mast Top Spacer 1/2 x 1" x 1"	"	14
2	Drums 3/4 Dia. x 1 3/4 long	"	15
2	" Cranks, Bent Nail	St.	16
2	" Pins, Nail, Cut 3/4 Long	"	17
1	Switch Complete	Bs.	18
1	Mast Bolt 3/16" x 2 3/4"	St	19
5	R.H. Wood Screws	"	20

No.	PART	MAT.	REQ'D
1	Magnet Bolt 1/4" x 2 1/4"	Iron	21
3	" Washers 3/8 x 1"	Fibre	22
4	Screw Eyes	St.	23
2	Staples 7/8" Long	St.	24
1	Dry Battery		25
Wire for Magnet			26
Cord as required			27

DETAILS OF ELECTRIC HOIST.

driven about ½" into the end of each dowell, then cut off leaving ¼" of nail projecting. This nail fits into a hole bored into the ⅞" piece and acts as axle for drum to turn on.

The handles consist of two 3" nails bent and cut to size as shown. These handles are driven into the center of each dowell, projecting far enough to straddle the ⅜"x¾"x2½" pieces and are fastened to them by means of a ½" staple.

The switch is made of sheet brass ½" wide and 2½" long. Two holes are drilled ½" from one end and ¼" from the other end. The switch knob is made of a ½" dowell, fastened with a ½" F. H. screw. The switch is fastened to the base with a ½" R. H. blued screw just tight enough so that it can be moved side-ways to open and close the circuit when required.

All wheels are of ⅜" basswood, 3" in diameter; the two wheels used for turning the hoist have a small groove filed around the center so the cord will not slip when hoist is in operation. The other four wheels are fastened to axles with 1¼" R. H. blued screws.

The magnet consists of a ⅜₁₆"x2½" R. H. stove bolt having two ⅞" fibre washers spaced 1½" apart. Before winding with wire the bolt should be insulated between washers with tape or a strip of paper. Six layers of No. 22 D. C. C. wire is wound on bolt, the leads being about 18" long. The leads are twisted together and pass through a ⅛" hole in front axle, one lead being fastened to positive side of battery, the other to the screw which holds switch in place. From the negative side of battery a short wire is run to the screw directly under the switch knob, so that when switch is moved in place, the circuit is closed and the bolt becomes magnetized forming an electro magnet.

A cord from one drum passes through a No. 1214 screweye in base, up over nail and is tied to the projecting arm as shown. Another cord from the other drum passes through a second screweye in base, over nail, through screweye at end of arm and is fastened to the magnet. This cord lowers and raises the magnet.

All wheels, the arm and upright are painted red. Other parts are painted battleship gray, except the drums which are given a coat of shellac.

A KNOCK-DOWN TABLE THAT BEGINNERS CAN MAKE

Leslie J. Miller, Director of Industrial Arts, Rock Springs, Wyoming

This table is made of ¾" clear white pine. The drawing will help to illustrate how the job is accomplished.

The boards for the top were glued together and allowed to dry. The top was squared up, scraped and sanded. The pieces marked C were made ¾" square and holes drilled from two directions and countersunk. These four pieces were used to fasten the rails A to the top by using number ten 1¼" F. H. B. screws. The pieces B were cut from ¾" stock and were ½" narrower than the side rails A. Four ⅜" bolts pass through rails A, blocks X, and pieces B, drawing the pieces B so tightly against the leg that it cannot move in one direction while the 2"x2"x3" blocks X, held securely in place by the bolts, keep the legs from moving in the other direction.

To take down, loosen the nuts, and pull out the legs.

WATER CONTAINER

Donald S. Harding, Elkins Park, Pennsylvania

(See Supplement No. 32)

Our shop is equipped with a very modern electrically driven grinder for sharpening edged tools. There is also provided an abrasive wheel for grinding metal-cutting tools for the metal working shop.

When grinding the last mentioned tools it is very desirable to dip them into water to prevent burning the edge. This grinder has no facilities for so doing.

The drawing shows a box made from sheet metal for attachment to the grinder. Some rust resistant metal is desirable. Zinc was used for ours.

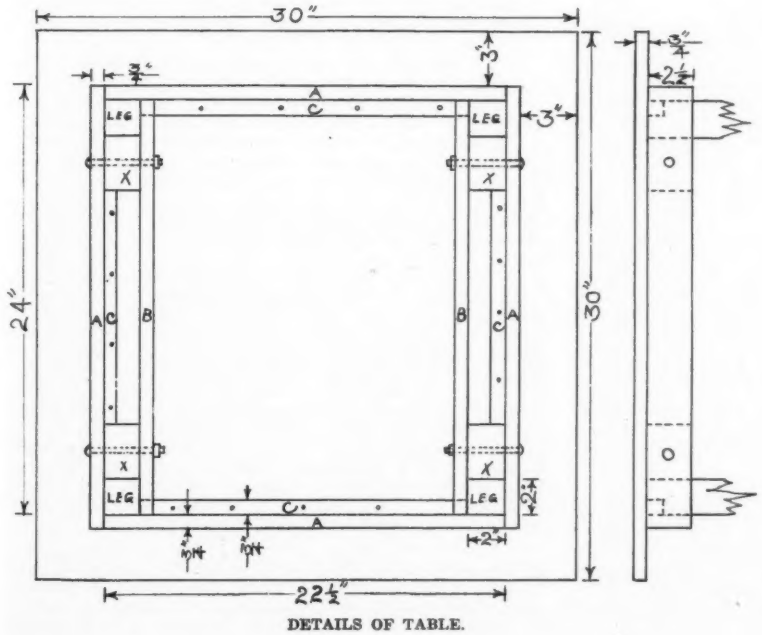
A POCKET SCREW DRIVER

Harold W. Hanson, Dover, N. H.

(See Supplement No. 31)

This project is not beyond the ability of boys in first year machine work and has a real value to any mechanic. These screw drivers have proven very popular with my classes and may help someone else to build up interest at a time of the year when work begins to drag.

The screw driver is small enough to carry in the pocket and yet the grip is as strong as that furnished on one with a longer handle. The handle is hollow and has space for three bits.



DETAILS OF TABLE.

The instruction for machining the various parts are arranged on operation sheets, of which the following is typical:

OPERATION SHEETS

Item No. 1—Handle

1—Select stock, 1⅛" dia., 4⅛" long (nickel steel).
2—Center both ends.
3—Face to length and turn diameters 1/32" oversize.
4—Place steady-rest on large diameter and drill 43/64" hole, 2" deep.
5—Tap 5/16" deep with ¾"—16 S. A. E. Tap; starting tap by setting center hole of tap on tail-stock center.
6—Machine item No. 3 and screw in place.
7—Turn all diameters to size and polish.
8—Knurl ½" space on ¾" diameter.
9—Taper chuck end and cut threads ½"-20 S. A. E.
10—Machine item No. 2 and screw in place.
11—Face even with end of handle.
12—Turn to size, polish and knurl ⅛" space.

FIFTH ANNUAL MEETING OF PRINTING INSTRUCTORS

At the fifth annual convention of printing instructors held at Indianapolis, June 30th to July 2nd, four major themes were stressed. These were progress and objectives in printing, lesson material, instructional methods, and shop problems. About 75 persons were in actual attendance at the sessions, the largest group ever brought together in the interest of printing education. Delegates were present from California, Colorado, Illinois, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New York, Ohio, Oklahoma, Pennsylvania, Tennessee, Toronto, and Washington, D. C.

Educational administrative officers were represented by Dr. C. B. Connelly, of the Carnegie Institute of Technology, E. E. Sheldon, Lakeside Press, Chicago, L. R. Abbott, Grand Rapids, Mich., J. E. Fintz, Cleveland, O., Allan Robinson, Baltimore, Md., and Ralph W. Polk, St. Joseph, Mo. The Typothetae was represented by Harry L. Gage, John C. Oswald, E. A. Kelley, Dr. Francis H. Bird, F. J. Hartman, Henry T. Hemming, and T. G. McGrew.

At the opening session on Wednesday, Mr. E. E. Sheldon spoke of his experiences as a schoolmaster who became a teacher and an administrator of printing instruction. T. G. McGrew of the Typothetae School, gave his experiences as a printer who entered the teaching field. Dr. C. B. Connelly, a pioneer in industrial education, gave freely of the wealth of his experience covering a lifetime in the field of industrial education.

At the luncheon given by the Indianapolis Typothetae, Mr. Julian Wetzel gave an interesting story of what Indianapolis stands for. John C. Oswald, Harry L. Gage, and Dr. Connelly also gave talks showing how printing education influences the printing industry.

The main topic for discussion at the meeting was progress in printing. The general subject was introduced by an illustrated lecture "In the Steps of Gutenberg," by John C. Oswald, who traced the evolution of printing from the inscriptions in the stone age to the art of the masters in the craft. Mr. Harry L. Gage followed with the subject, "Progress in Typography." He emphasized his remarks by commenting on books printed in France, England, Germany, Italy, and the United States.

Progress in Linotype work was discussed on Thursday by Mr. Thomas Knapp. Mr. Craig Spicher, of the Miehle Press Co., Chicago, speaking on "The Progress of Presswork" on Thursday afternoon, gave some facts and illustrated his talk with valuable charts. "Progress in Monotype" was discussed on Friday by Mr. David H. Mallalieu.

On Thursday "Objectives in Printing Instruction" was the topic for discussion. Facts brought out in a survey of printing education in some three hundred schools furnished the basis for the discussions.

Printing as a manual training subject in an elementary school was handled by Mr. L. R. Abbott. Mr. J. E. Fintz, Cleveland, O., gave the results of several studies he had made of print shops and printing schools in his talk on "Printing as a Vocational Subject in a Junior High School." Mr. H. R. Hayes prepared a paper on "Printing as a Cultural Subject in an Academic High School," which was read by another. It was contended that printing in academic high schools is a cultural subject, of greater possibility than any other industrial subject, has a greater influence on the student body, creates interest, and holds students. Mr. C. Neville Walker, of the Cass Technical High School, Detroit, Mich., outlined the "Objectives of Printing Instruction in a Technical High School." Mr. Allan Robinson, gave the objectives in a part-time school as well as in a technical high school, which is a part of the public school system of Baltimore, Md.

Mr. Hugo Jahn, of Wentworth Institute, Boston, speaking on "Textbooks on Printing," made a selection of twenty typical books and gave brief criticisms of each.

Mr. Ralph W. Polk showed how teachers of printing might profit by using the representative trade journals and literature as lesson material.

Mr. L. F. Knowles of the Johnson High School, St. Paul, Minn., spoke on the subject, "Distributing Type in the School Printshop." He made use of work of students to back his arguments. "School Publications and How They May Be Carried Successfully" was treated in a practical manner by L. A. Carpenter, Indianapolis. "Production Versus Instruction" was a topic for open discussion by the members present.

The concluding address of the meeting was given by Dr. F. H. Bird who spoke on the subject "The Next Step for Teachers of Printing." Dr. Bird stressed the necessity of a national teachers' organization and presented a constitution and by-laws.

It was decided to hold the yearly regional conferences with representative schools of printing in various sections of the country.

KANSAS TEACHERS' COLLEGE CONFERENCE

Education for life was the keynote of the addresses at the fourth annual summer conference on vocational education held at Kansas State Teachers' College at Pittsburg from July 14th to 17th. General meetings and special assemblies of the entire summer session of the school were held, interspersed with round table gatherings. A summer enrollment of nearly 3,000 made a good sized audience to listen to the story of vocational education and its tie-up with general education and with life. The general meetings were attended by vocational homemaking teachers as well as by those interested in trade and industrial education.

Dr. R. O. Small, state director for vocational education for Massachusetts opened the conference with an inspiring address on "Work as a Factor in the Education of Minors." In part he said:

"The place of work in education is a vital one. Work is necessary in the physical, mental and spiritual life. If we are to grow, work must have a dominant place in our lives. Many so-called educators look upon the subject of manual labor as if it were the name of a Mexican, and relations with manual labor by our system of education have often been severed as have been our relations with Mexico. Our relations with manual labor will be re-established.

"In considering the child labor question there are some questions which should be kept in mind. When and how much work should children do? Can labor be given as a part of the educational program? When should children go to work?

"Age does have a definite relationship to the problem, but some children should go to work sooner and some later than the state laws permit.

"Three groups of people are concerned in legislation on child labor. The social group which does all it can to fight child labor and wishes children to be educated formally, without any regard to their later ability to earn a living. People of this group back up child labor and compulsory education laws. The second group want the children to work, disregarding all standards. The third group is made up of the mass of citizens who follow the most attractive leaders and possess no definite ideas of their own. From none of these groups comes a real solution of the problem.

"Lincoln pointed the man in his statement, 'It but remains for us to devise the way by which the work of the world may be done and education be carried along with the doing of the work of the world.'"

In conclusion Dr. Small advised the men present to "educate youth to work and to live by work."

The following vocational men from surrounding states were the guests of the conference and took an active part in discussion at the various round tables:

Dr. R. O. Small, state director of vocational education of Massachusetts; Lewis Gustafson, director of David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo.; Charles W. Briles, state director of vocational education of Oklahoma; Adolph Shane, professor of vocational education, Iowa State College, Ames, Iowa; H. C. Givens, state supervisor for trade and industrial education of Arkansas; H. L. Freeland, state supervisor of trade and industrial education, Nebraska; C. F. Klinefelter, regional agent for Federal Board for Vocational Education; Harley Brook, state supervisor vocational education, Iowa; E. E. Tourtellotte, president of Oklahoma State School of Mines; R. B. Mitchell, professor of mining, Oklahoma State School of Mines; S. M. Boydston, extension department, Oklahoma State School of Mines; O. B. Badger, assistant supervisor of trade and industrial education of Oklahoma; I. R. Anderson, foreman trainer for Tri-State Lead and Zinc Region of Missouri, Oklahoma and Kansas; E. G. Barber, Salina, Kans.; O. H. Day, director of industrial and vocational education, Kansas City, Mo.

At a faculty dinner in honor of the conference guests on the evening of July 14, over a hundred gathered in the college cafeteria. The program was unique in that the after dinner talks were scheduled as classroom lectures in a printed "Evening School Bulletin." Each speaker

lectured to his class until the ringing of a classroom bell by President W. A. Brandenburg, toastmaster.

In special assembly of the college on the morning of the 15th, Mr. Lewis Gustafson, director of the Ranken School of Trades of St. Louis, spoke on "True Education."

"People have all sorts of ideas of education but true education is to teach the art of living. The older people have been under the mistaken notion that we ought to teach the young to be like them. The young have seen us and hope for a kinder fate. I am going to make a plea for the true spirit of the profession of teaching and the spirit of true education. I should like all teachers to get the idea that it is not the subject that is the main part of teaching. The main part is to teach the art of living. Teach ideals to real human beings instead of teaching subjects."

Dr. William McAndrew, superintendent of schools of Chicago, lectured at the college on the afternoon of July 15 and the morning of July 16. "If you trace the course of education," said Dr. McAndrew, "you will find that each part of our country copied the school system of the states to the east of them. The states on the east coast got their pattern from Old England about the time of Queen Anne and King Charles. This education was designed for an entirely different purpose from the purpose that we as American citizens have in mind for our children. That education was planned for the gentlemen of the time. If one of those gentlemen was to come up here upon this stage today you would recognize him by his expensive clothes that were not made for labor and which, with their delicate laces and starched Ruff discouraged perspiration and hard labor. And so education for hundreds of years was the ornament of the person, not for the common man who works. For the gentleman and scholar and not for the laboring man."

The men in charge of evening classes for coal miners in Kansas and Oklahoma met during the afternoon to discuss better instruction material for such classes.

On the evening of July 15 conference guests were the special guests of the faculty men at their "annual feed" at Spring River. They were given a chance to show what they could do at horse shoe pitching and their capacity for pork chops and watermelon.

Mr. I. R. Anderson, foreman trainer for the tri-state lead and zinc region of Kansas, Missouri, and Oklahoma, had charge of the program on the morning of July 16. He conducted a foreman conference session and used his audience as a group of foremen. His methods of work won the interest of the group and made the conference a real success.

On the afternoon of the 16th, Mr. Gustafson spoke upon the subject, "Every Boy and Girl Entitled to a High School Education and a Trade or Profession."

"It is absolutely necessary," he said, "that everybody shall have a trade or a profession. Everybody must earn his own living and pay his way in a democracy. Parasites are not wanted. The idle rich and the idle poor are equally undesirable in a country like ours."

Dr. Small in his final address of the conference on the afternoon of July 16 said in part: "There are three primary essentials for happiness in this world. They are, (1) something to do, (2) something to look forward to, and (3) something to love. When you truly have the first two, the third, something to love and take an interest in will follow.

"To have a comprehensive vocational program for workers, we must have faith in democracy and the youth of democracy.

"Vocational education is not class education. It makes for independent and free people. It costs money, but in the long run it is worth the price. It opens the windows and doors for some people who have had a limited amount of culture and establishes a motive for them to secure and get culture. Culture and doing the world's work has always gone hand in hand. Some of the world's greatest writers worked at trades. John Greenleaf Whittier was a cobbler. He made boots and shoes but he had culture."

At one session a tentative constitution and by-laws were considered for an organization to be known as the Kansas State Association of Industrial and Vocational Education. Final action will be taken at the meeting of the vocational and industrial section of the State Teachers' Association at Hutchinson this fall.

The conference closed Saturday morning with a round table at which the common problems of vocational directors from Kansas cities pooled their common problems and planned remedies for them.

MEETING OF DEPARTMENT OF VOCATIONAL EDUCATION, NATIONAL EDUCATION ASSOCIATION

The meeting of the Department of Vocational Education of the National Education Association was held June 29th to July 1st, at the Spring Garden Institute, Philadelphia, Pa.

At the first session on Tuesday, Mr. Charles F. Bauder, Philadelphia, Pa., presided. Miss Isabelle Craig Bacon, special agent of the Federal Board for Vocational Education, Washington, D. C., gave a talk on "Retail Store Training in Paris." Mr. F. Theodore Struck, Harrisburg, talked on "New Developments in Industrial Arts Education," and Mr. Frederick Horridge, Ohio University, Columbus, discussed "A Comprehensive State Plan for the Training of Trade Teachers."

HOWARD L. BRIGGS,
Director of Vocational Education and Practical Arts,
Cleveland, Ohio.

Mr. Howard L. Briggs, Cleveland, presided at the second session on Thursday. Miss Ruth Sill, of the Girls' Trade School, Philadelphia, discussed the subject, "What Can a Girls' Trade School Do for Girls and Women in Industry;" Mr. R. F. Carey, of the Westinghouse Electric and Mfg. Co., Lester, Pa., talked on "Apprentice Training in the Metal Trades;" Miss Adele Rudolph, Philadelphia, discussed "The Function of Industrial Arts in the Early Grades," and Mr. G. A. McGarvey, of the Federal Board for Vocational Education, Washington, talked on "Present Tendencies in Industrial Education."

The officers elected for the year were:

President, Howard L. Briggs, Director, Department of Vocational and Practical Arts Education, Cleveland, O.; Vice-President, Dr. F. T. Struck, Director, Bureau of Vocational Education, Harrisburg, Pa.; Secretary, Mr. N. S. Hundson, State Director of Vocational Education, Austin, Tex.

THE PENNSYLVANIA VOCATIONAL ROUND TABLE

The Vocational and Industrial Arts Round Table for superintendents, directors, teachers, and industrial plant executives of Pennsylvania was held July 23rd at the Carnegie Institute of Technology, and July 24th at the University of Pittsburgh. The meetings were held at the faculty clubs of the two institutions and were under the joint auspices of the University and Carnegie Institute of Technology.

The first meeting on Friday was directed by Mr. Robert B. Leighou, of the Carnegie Institute of Technology and was well attended. The first speaker was Mr. A. W. Grotefend, who outlined briefly the problem confronting industry in its search for adequate human material to do the directing and organizing. He described the methods used by the Aluminum Company of America and the means taken to train foremen. His remarks brought forth an interesting discussion showing the interest in this subject.

The next speaker was Mr. C. S. Coler, who outlined the educational program of the Westinghouse Electric &

Mfg. Company of East Pittsburgh. He spoke on the subject, "The Training of Apprentices."

"The Wisconsin Apprenticeship Law" was the subject of a paper read by Mr. Robert L. Cooley, director of vocational education at Milwaukee, Wis. He traced the steps that led to the establishment of the Milwaukee Vocational School and its acceptance by industry, and outlined the initial efforts to acquire legislation for such a project. He explained the benefits to society and gave facts relative to the social levels attained upon progression through the institution and the consequent benefits to business in the vicinity.

At the second session on Saturday morning, the round table went into conference at the Faculty Club, with Mr. G. D. Whitney of the University of Pittsburgh as chairman.

Mr. L. H. Dennis, the first speaker, opened the session with a rather forceful talk entitled "The Present Status of Vocational Curricula in Pennsylvania." Every kind of problem from the little rural school to the large cosmopolitan school system was described so that those present had a pretty general idea of the situation in industrial education and vocational education in Pennsylvania.

Dr. Walter B. Jones, who followed Mr. Dennis, spoke on points relative to the tri-state meeting in West Chester in August. Dr. Jones was followed by Mr. Cooley, who spoke this time on the subject, "Society's Stake in Vocational Education." Mr. Frank M. Leavitt of Pittsburgh led in the discussion which followed. He made a critical study of the points brought out in the several addresses and summed up in fine fashion all the important facts brought out in the two-day meeting.

A SURVEY OF COMMERCIAL GRADUATES IN HIGH SCHOOLS

A survey of the commercial graduates in the Wisconsin high schools was made last spring by J. T. Giles, state high school supervisor for the state department of education. It discloses the fact that out of 4,918 students, covering 108 schools, 27 per cent of the graduates are boys and 73 per cent girls.

About 23 per cent of all the graduates are reported as holding positions requiring bookkeeping and 32 per cent requiring shorthand. The larger number of those keeping books are boys while the larger number of those employed as stenographers are girls.

Mr. Giles draws the conclusion that the commercial courses in high schools are better adapted for boys than for girls. He says: "Seventy-three per cent of the graduates are girls. Only 13% of the boys who graduate hold positions requiring a knowledge of stenography while 38% of the girls hold such positions. Unless it can be shown that shorthand has considerable cultural value in addition to its vocational use there is evident waste for the 87% of boys who study shorthand for two years, two hours per day, and then do not use it in an office position. It would at least seem but fair to the boys entering on a commercial course that they be informed as to the prospects of such employment. The commercial course is largely a girls' course.

"The commercial course is better adapted to large schools than to small ones. The table shows that nearly one-half (45%) of the graduates of the largest schools hold positions calling for stenography, while in the smallest schools only one-sixth (16%) of the graduates hold such positions. The reason for this is apparent. In the villages and rural communities there are fewer positions open to commercial graduates and in order to secure such positions the graduates must leave home and go to the city. Only a small percentage are able to meet this requirement.

"A very large percentage, evidently over one-half of all commercial graduates from all Wisconsin high schools never hold a position where they use vocationally the subjects of bookkeeping and stenography. This is the case more in rural communities than in large cities and more for boys than for girls. It is evident from the reports that in nearly every instance graduates holding bookkeeping positions also hold stenographic positions and vice versa.

"The conditions just described necessitate a frank discussion of the benefits to be derived from a study of the subjects contained in the commercial course. For those who are pursuing the course with a vocational motive and expect to enter an office or business where such knowledge and skill will be required there is no question. The only consideration here is whether or not they are being adequately prepared for the positions they will hold. For the large number of graduates who do not use the course vocationally the answer is not so easy and the question is open to debate. While it is not possible in this brief report to discuss the matter adequately it is important that high school pupils and their parents should have access to the facts as far as they are known and that they should have an opportunity to discuss the merits of the question among themselves and with their teachers.

"The chances are one in four or one in five that a graduate of a commercial course will hold a position requiring a knowledge of bookkeeping. The chances are only slightly better in the larger schools and somewhat better for boys than for girls. Under these conditions, the only possible conclusion seems to be that bookkeeping, if it is to stay in the curriculum, must become a more "general" or cultural subject. This is particularly true in the smaller schools.

PIECES OF STRING

The caption of this item is the title of a series of folders prepared by Mr. Allen D. Backus, supervisor of manual training, Newark, N. J., and sent during the past year to instructors. The pieces of string are brief, inspirational essays intended to recall to manual training teachers some of the great fundamental principles of teaching as applied to shop work. They are informal, highly interesting, and call attention to matters which are very difficult to discuss in a formal way.

In all the essays, there is not the slightest suggestion of preaching, in fact the great part of the essays contain lessons in first principles, which can only be read between the lines. The following reproduction of a folder entitled "Echoes" will give a clue to the whole series:

"We were fishing on a lake in Maine. Things were as quiet as they can only be out in the woods. The canoe was drifting lazily fifty yards or so from the wooded shore.

"The guide interrupted our reveries with the suggestion that one of us shout. As it was nearing noon the cry that went forth was 'I want food.' A moment's pause and from over the tree tops, out of the forest came back: 'I want food.' Every tone, every inflection, even the volume came back exactly as it had gone out.

"The guide had paddled the canoe to the exact spot where nature responded uncannily with a perfect echo. Hearing your own voice come back out of the primeval solitude—never hurried, minutely exact in its mimic, pause for pause, sound for sound—was almost as exciting as catching a four pound bass, and much more awe-inspiring.

"Sometimes, in the shop, I think I must be back on that lake in Maine—for the echo is perfect. The teacher asks a question. A boy answers. Back from the teacher comes the echo. Like this—

Teacher: What edge is this?
Boy: The working edge.
Teacher: Yes, the working edge.

Echoes in Maine are grand but let's fix our shop acoustics so that they are impossible.

Do it this way—you all know why:
Teacher: What edge is this?
First Boy: The working edge.
Teacher: Good—What did he say?
Second Boy: The working edge.
Teacher—pointing to still another boy: What edge is it?
Third Boy: The working edge.
Teacher proceeds with lesson. No echo, but better teaching.

SUPERVISORS CONDEMN WORK OF CONTINUATION SCHOOLS

A thorough reorganization of the New York City continuation school system is needed in the opinion of a committee of fourteen district superintendents, who made a special study of each one of the schools for young workers maintained by the local board of education. A summary of the recommendations, prepared by Associate Supt. Gustave Straunbenmuller, shows that there is hardly a single phase of the continuation school plan which has not been criticized by one or another of the superintendents.

Practically every superintendent, according to Dr. Straubenmuller, doubts if much can be accomplished in the four hours a week for which young working boys and girls are required to attend continuation schools.

Some recommended that attendance at evening high and trade schools be accepted under certain circumstances for continuation school study. Another recommendation

is that special provision be made for continuation school students who have attended high school and who wish to take up more academic work. The lack of proper equipment and buildings is criticized.

The item most severely criticized is the job sheet, not that it is wrong in itself, but that in carrying out the job sheet plan, the stencils are cut by the pupils and a lot of mistakes in spelling, punctuation, etc., creep in. These papers are handed to the pupils and they see mistakes which they should not have seen.

Some of the superintendents believe that the work should be graded so as to fit the different mentalities of the pupils in the same class.

There is severe criticism of the lack of equipment, of inadequate buildings and inadequate supplies.

The severest criticisms are on the schools opened only a short time. For example, the building trades school and the central commercial continuation school.

There is also criticism of discontent of pupils in schools in which the shop equipment is poor. In the Brooklyn boys' continuation school, they have only two shops, a woodworking shop and an electric wiring shop. The boys who are not particularly interested in woodworking or electric wiring are discontented because they are not getting the shopwork they desire.

The east side school received the most favorable comment of all the schools. The Bronx and the west side schools also were favorably reported.

A summary of the recommendations is as follows:

1. That pupils who are discontented be segregated and given instruction by special teachers.
2. That ex-high school students be placed in a class by themselves for academic purposes.
3. Campaign for the education of employers.
4. That no pupil should be compelled to attend continuation school after his seventeenth birthday.
5. Provision should be made for those who are wholly academically minded.
6. Discretion should be lodged in some office to permit pupils to substitute authenticated attendance at an evening school or a trade school for the continuation school requirement.
7. Several think that there should be more supervision, particularly as to the shop work and that that supervision should be of an expert character, i.e., supervision of machines, etc.
8. That the teacher load is too heavy.
9. More intensive, continuous and specialized supervision is needed.
10. A separate director for evening schools and for continuation schools, as it is impossible for one man to be on duty from early morning until late at night.
11. That the financial authorities be requested to supply the necessary funds for the decent housing of the continuation schools, for the installation and improvement of equipment and for the necessary supplies used in the various types of academic, vocational and commercial work, and carefully defined license and merit system appointment and promotion and liberal compensation.
12. Assign pupils to work they are engaged in during the day.
13. Groups should be more homogeneous.
14. Some class and group teaching. Not all should be individual instruction.

POLICIES AND PROCEDURES OF THE SPECIAL DEPARTMENTS IN THE LOS ANGELES PUBLIC SCHOOLS

The special supervisors and administrators of the Los Angeles, California, public schools, have undertaken a study of the policies and procedures governing the work of the special departments. The outline of procedures in the manual arts department worked out by Mr. Charles A. Kunou, director of elementary manual training work, is suggestive to all manual arts supervisors.

In general the Los Angeles group has sought to determine the general principles which must be subscribed to by all the supervisors; to establish the relations which should exist between the superintendent's office and the supervisors or directors, and between the supervisors and the principals; to outline methods for developing and increasing the morale and efficiency of the teaching staff; to lay down policies whereby supervisors and directors may use their time to the best advantage; to outline ways in which valuable suggestions may be given to new teachers, and to offer suggestions for the grouping of teachers.

In connection with the study, the group undertook to define the duties and responsibilities of those who fill the position of supervisor. In outlining the duties of supervision it was the opinion that these should include attention to special details such as checking attainments and deficiencies in special work for which supervision is particularly needed; overseeing the work which must include definitions, aims, and plans of special work and the carrying out of these plans; and finally, the direction of the work with authority. Teachers, it was pointed out, must be assisted as much as possible to understand the principles which will remove their limitations and will eliminate inability in the work performed.

In applying the opportunities and possibilities of the plan directly to the manual arts department of which he is the head, Mr. Kunou presented a schematic outline of administrative and executive duties, which he believes should be understood and carried out by the supervisors and assistant supervisors connected with the work of his department. These are listed in order as follows:

1. Report making.
2. Statistical compilations, etc.
3. Over-hauling and O.K.ing of requisitions.
4. Demonstration teaching in the manual education rooms.
5. Supervision, observation and inspection of teaching.
6. Group conferences with teachers.
7. General teachers' meetings.
8. Rating of teachers.
9. Official record keeping.
10. Organization of new classes and work.
11. Course of study and curriculum making.
12. Surveys.
13. Collecting and organizing materials for bulletins and manuals.
14. Installment of new equipment and opening of new manual education rooms.
15. Budget making.
16. Lectures and addresses before clubs and other organizations.
17. Cooperative efforts with manufacturing, industrial and social organizations and patrons of the schools.
18. Organizing and making plans for projects for other departments in the schools.
19. Progressive study and reading for self-improvement.
20. Conferences in Superintendent's Office.

A SHOP TEACHER'S CALENDAR
Timely Tasks for September

Shop Management—Check tools, supplies, equipment, and textbooks against spring inventory. Check new tools, equipment, supplies, and books delivered during vacation.

Clean tools and equipment for use; oil machinery and adjust for service; get out stock for beginning classes.

Plan shop duties to be performed by pupils, care of tools, entry and dismissal of classes, care of tools, etc.

The Courses—Outline the semester's work and smooth out schedules in line with any changes in the course of study.

Re-study the related work and shop drawing, and plan for cooperation with other shop teachers and academic teachers.

Professional Work—Plan self-improvement program for winter through professional study and reading.

Plan magazine list and books to be added to personal and school libraries. Plan university correspondence or extension work.

Plan some special work like survey of the pupils' vocational intentions, or the vocational opportunities of the community, or a study of common trees of the locality.

The First Day—Meet classes and see that work is in progress at the earliest possible hour.

Organize and group boys into homogeneous groups. If possible, give mechanical aptitude and other tests as a basis for classification.

AIMS AND OBJECTIVES IN INDUSTRIAL ARTS

The special committee on aims and objectives, of the Iowa Association of Manual and Industrial Arts Teachers, at a sectional meeting of the State Teachers' Association, held at Des Moines, adopted a statement of aims and objectives in industrial arts. The committee, which was headed by Mr. A. P. Twogood, adopted recommendations providing for higher standards of training, for courses of study setting forth the minimum essentials and aiding in measuring achievement, and for better correlation of industrial arts with academic subjects. The committee recommended the establishment of an educational committee to investigate and bring to the attention of members, the latest developments in the industrial arts, in order that as a state, Iowa may maintain a satisfactory standing in the industrial field.

As a means of classification, the aims and objectives have been divided into two groups, namely, general and special. The report offers the following aims and objectives:

A. General Aims

1. Culture.
   a. To set up ideals of good workmanship.
   b. To develop an appreciation of art through good design; i. e., harmony in form, detail and color.
   c. To develop character forming habits and aptitudes; i. e., responsibility, patience and perseverance.
   d. To develop a spirit of co-operation.
   e. To develop thoroughness, accurateness, and neatness.
   f. To develop an appreciation of industrial life and conditions, procedure, possibilities, etc.
2. To make contacts with the practical applications of mathematics and sciences; i. e., measuring, estimating, construction of mechanisms, electrical circuits, etc.
3. To develop initiative and creative thinking; to strengthen interest in the problems to be solved.
4. To awaken avocational interests in the pupil.
5. To acquire industrial information as a means to educational and vocational guidance.
6. Self expression through participation in various shop activities.
7. To develop physical and mental coordination through the use of common hand tools and materials; i. e., to develop manual skill.

B. Special Aims

1. To meet certain needs of the over-age pupils.
2. To develop an interest factor for keeping boys in school.
3. To develop skill in home construction and repairs.
4. To stimulate interest which may lead to training of a definite vocational type.

As a means of securing these aims and objectives in daily work, the following suggestions as to methods are made:

1. Care to be taken to instruct the boy to a high standard of care and precision in sharpening tools, in method of handling tools, and in laying out work.
2. Training in orderly and economical habits in the requisitioning and use of materials.
3. Specific instruction in design.
4. Real thought producing instruction which will arouse the pupil's mental faculties.
5. A variety of subjects and projects.
6. Inspection of industrial plants, construction work and processes, supplemented by motion pictures and lantern slides.

STANDARD OPERATIONS IN CABINET MAKING

Mr. M. Alphonse Sanguinet, instructor in cabinet work in the Worcester Boys' Trade School, has prepared the following series of directions for standard operations in cabinet making:

1. Make a detailed drawing of job where necessary.
2. Lay out job on rod with knife and square, using pencil to denote different members in construction.
3. Make out stock bill, getting dimensions from rod.
4. Select stock, look out for knots, checks and other defects.
5. Use boards that will cause the least waste in thickness, width and length.
6. Saw stock in the rough, allowing about 1 inch on length for squaring up after stock is planed and sawed to width.
7. Allow at least one-fourth inch on width for jointing straight and sawing to exact width after stock is planed.
8. Joint one side and best edge straight and square on jointer.
9. Plane to thickness.
10. Allow about one-sixteenth inch to thickness on all boards to be glued together and plane to exact thickness after boards are glued.
11. Saw to width allowing about one-sixteenth inch for jointing rough edge when necessary.
12. Cut to exact length, squaring both ends.
13. Face mark best side of stock.
14. Lay out stock for mortises, tenons, grooves, etc., from rod.
15. For panel work, mortises should be made first, tenons second, grooves third and panels fitted to grooves fourth. Always work from face side of stock.
16. Panels should be made about one-fourth inch narrower to each 12 inches in width to allow for swelling.
17. When gluing up panel work use no glue on panels as they should be left free to swell and shrink.
18. When clamping stock together use blocks or strips to avoid bruising stock.
19. While glue is soft see that frame work is perfectly square.

DUTIES OF THE VOCATIONAL COUNSELLOR

A conference of junior high school principals and counsellors was held at Jackson, Mich., under the direction of Charles A. Wardner, director of vocational guidance, to make clear the work of the counsellors and to outline the special duties connected with the work of the counsellors. Under the rules, the counsellor is expected to carry out the following duties:

1. (a) Supervise the selection of electives in curriculum; (b) selection of an occupation; (c) improvement in school work.
2. To have final contact with all pupils leaving school for employment.
3. To have charge of filling out and approving applications for working permits.
4. To prepare general suggestions for home room teachers in regard to proper selection of elections.
5. To advise teachers as to the amount of work certain pupils can carry as indicated by mental tests and past school records.
6. To be responsible for the proper filling out of questionnaires and their use in his own office and when distributed to home room teachers.
7. To prepare for and conduct group counseling.
8. To teach occupational classes.
9. To collect and classify occupational information.

NOW, ARE THERE ANY QUESTIONS?

Bent Wood

Q: I am doing some work with willow and reeds and want to make some frames. How can I bend willow or dowels? The arms and backs of some chairs I have seen are round and bent in graceful forms. I would like to know how they are bent?

A: Willow and other wood may be bent by steaming it in a boiler or steam box and bending it to shape in a jig or form.

Bending hardwoods for chairs is almost too difficult for the average school shop. It is better to buy bent pieces from manufacturers. (Names sent by mail.)

Public Utilities Offer Equivalent of Trade Training. Mr. Arthur Williams of the New York Edison Company, in an address broadcasted from Station WRNY, New York City, told how public utilities of the country offer to young men and women the social and economic equivalent of the apprenticeship training of former days and thus raise the national educational and citizenship standards.

Mr. Williams pointed out that with the growth of public utilities and a recognition of the need for the trained mind in every department of service, there is a new educational development which will be found to exceed in economic and social value, the apprenticeship of other days. Through the modern utility school, the trained mind is serving every human interest. In it are found an atmosphere of opportunity and advancement reaching into the work of a greater number than would be possible under the former method of training which has been superseded by modern industrial organization.

He pointed out that the training of personnel to give competent public service must begin with the youngest and in the most elementary work and continue through to those occupying the highest positions. To meet the constant change in methods and applications, it is necessary that constant education be provided so that even the most competent may not fall behind and fail to keep in step.

When it is noted that fully 95 per cent of the young men and women of the country go directly from the average graduating age of the public schools into their lifework, said Mr. Williams, the advantages which the public utilities offer their employee organizations can be better appreciated. Without a desire to underestimate the value of the college and university, it should be a matter of gratification to know that the public utilities find it desirable and essential to provide these additional educational opportunities to the members of their organizations. These organizations are not proceeding from the standpoint of a philanthropic or charitable contribution but in the knowledge that by rendering service of ever-improving standards, the utilities may best serve themselves by serving their customers and the public.

Feuerstein Unit Plan of Organized Diversified Activities in Industrial and Practical Arts. By Harold Feuerstein, instructor in industrial arts, Princeton, N. J. An outline of a course of study for a general shop in auto-mechanics, concrete construction, electricity, mechanical drawing, photography, sheet metal work and woodwork. All of these activities are carried on in one shop especially planned and equipped.

New plans that will interest your boys!

THESE Stanley Plans are complete. Each plan has a working drawing, a stock layout and a list of necessary materials and tools, as well as complete instructions for making the project.

Perhaps you can use these plans in your school work. If used for this purpose, we suggest mounting them on a heavy backing. Some will suggest suitable Christmas gifts that your boys can make.

Have you a set of these plans? We will be glad to send several, or all of the series, to any manual training instructor, free of charge. They are regularly priced at 10c each; 3 for 25c.

The Stanley Catalogue No. 34 should be in the hands of every Manual Arts or Vocational Supervisor or Instructor. It lists and shows pictures of over 1500 items, as well as detailed drawings of their construction and adjustment.

In addition, the appendix gives a number of tables covering subjects pertinent to woodworking.

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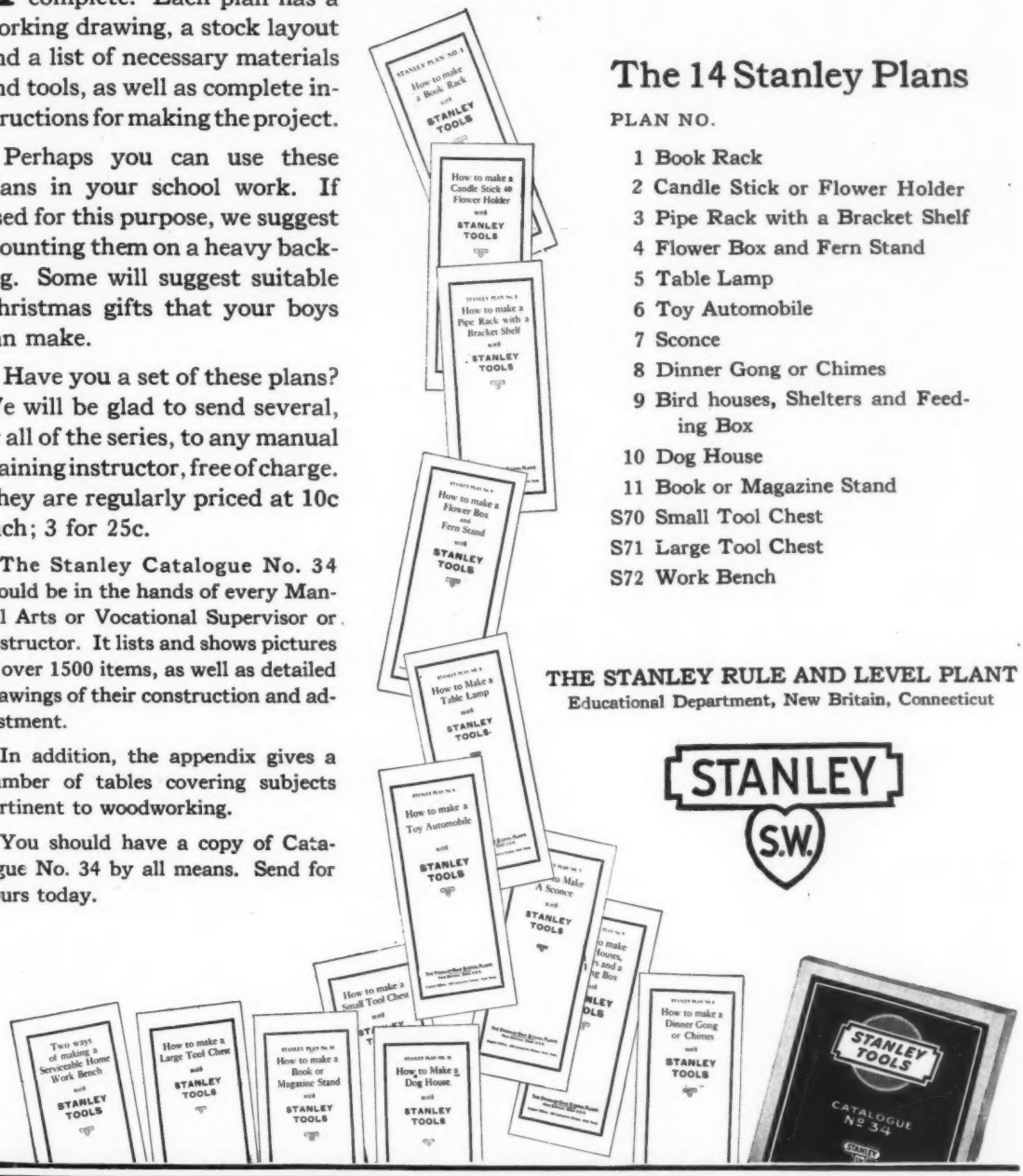
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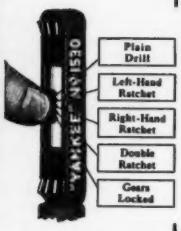

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Handbook for Bakers

By A. F. Gerhard. 477 pages. Price, $5. The Century Co., New York, N. Y.

This textbook is a complete manual, offering a comprehensive inside view of the baker's trade, prepared by one who has had exceptionally wide experience in the baking trade both in America and abroad.

The book deals with every phase of the baking business, from raw materials and purchasing of supplies, layouts of shops, etc., to salesmanship and the general management of bakeries. It gives several hundred recipes for making breads, rolls, special cakes, fancy pastries, sweet goods, icings, and the like. An entire section is devoted to directions for ornamenting and decorating cakes and a complete glossary is included of terms used in the trade.

American vocational schools have been handicapped in their development through the lack of similar technical and trade manuals for a considerable number of occupations. The present book is essentially a reference work rather than an introductory text and as such will serve both in the classroom and later in the shop where the apprentice may be employed as a journeyman or proprietor.

Industrial Electricity—Part II

By Chester L. Dawes. Cloth, 480 pages, illustrated. $2.75. McGraw-Hill Book Co., New York City.

This book is a continuation of an earlier volume and is devoted entirely to the principles, mathematics and applications of alternating circuits. The work is treated rather simply, but thoroughly and should appeal to classes of journeymen and apprentices, rather than engineers.

Millinery

By Jane Loewen. Cloth, 213 pages, illustrated. Published by The Macmillan Co., New York City.

The subject is treated from the practical vocational standpoint for girls and women who desire to enter the millinery trade or make their own hats. The construction of the various types of hats at present in general is fully described. Materials, colors, design are taken up. The book is fully illustrated. The types of hats shown are not selected because of styles of the moment but rather because they illustrate types which are likely to be useful for a year or more.

Problems and Projects in Industrial Arts

By Kenneth R. LaVoy. Cloth, 144 pages. Price, $1.25. Manual Arts Press, Peoria, Ill.

This collection of problems and projects includes work in bench woodwork, electricity, radio, concrete, sheet metal, and advanced woodwork. The introductory notes in each of the six sections discuss tools, materials, and simpler operations. The projects are simple, well designed, well graded, and easily within the ability of boys in the grades. The tools required are limited.

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The hosiery industry; the department stores occupations; the shoe industry; the office boy; office clerical workers; accounting occupations; office machine operators; secretarial work; the structural iron worker; the steamfitter, and the sheet metal worker.

Prepared by Mr. H. S. Belman, under the direction of R. H. Rodgers, chief of the Division of Vocational Teacher Training, Milwaukee Vocational School, Milwaukee, Wis. Issued by the Vocational School at Milwaukee.

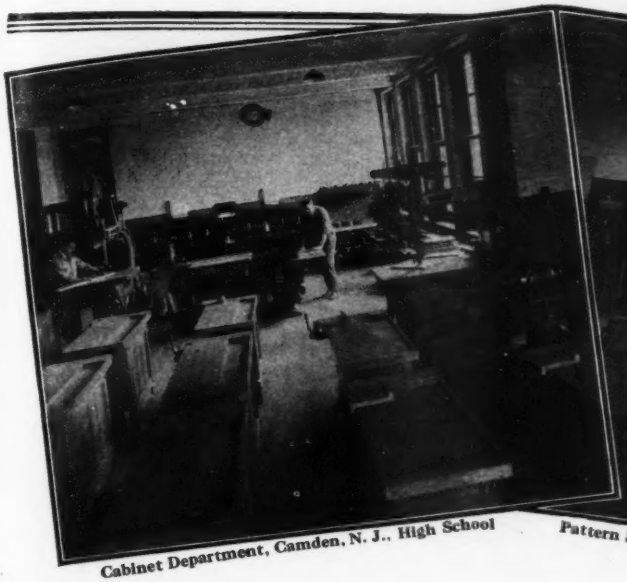
The several pamphlets have been prepared to serve as sources of information and guides for the students in their adjustment to life's work. They should prove of practical value to teachers, parents, and counsellors confronted with the problems of vocational and educational guidance. Some of the occupations listed are those peculiar to Milwaukee and represent an important part of the industrial life of the community. They are the occupations into which students will be likely to enter and for which there will always be a demand for workers of the right kind.

A Course in Sheet Metal Work for Junior High Schools

By J. W. Bollinger. Cloth, 96 pages, illustrated. Published by the Bruce Publishing Co., Milwaukee, Wis.

This simple text is intended to serve as an introduction to sheet metal work in the junior high school. The elementary processes are applied to simple problems which can be used in the household. Sufficient supplementary information on materials and on the mathematics of the subject are added to round out the course. A minimum

(Continued on Page 30a)



Cabinet Department, Camden, N. J., High School

Pattern Shop

The Importance of Correct Methods of Shop Practice

A teacher who strives for correct methods of shop practice knows he can reach that ideal only by the use of real industrial machines. Such a man is Mr. Harley E. Smith, Instructor in Woodworking in the Camden High School, Camden, N. J.

The two illustrations at the top show sections of the Pattern Shop and the Cabinet Department in this school and the following is a list of Yates-American machines in each.

CABINET DEPARTMENT	PATTERN SHOP
No. 5 Sander	No. 13 Pattern Maker's Lathe
36" Band Saw	10-12" Speed Lathes
Hollow Chisel Mortiser	36" Band Saw
Self-contained jig saw	No. 2 Surfacer
1 - Speed Lathe	12" Jointer
	No. 20 Universal Saw

Camden, N. J. High School

MR. HARLEY E. SMITH
Instructor of Manual Training

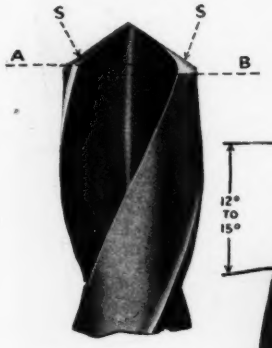
The tools of school are the tools of life

YATES-AMERICAN MACHINE COMPANY

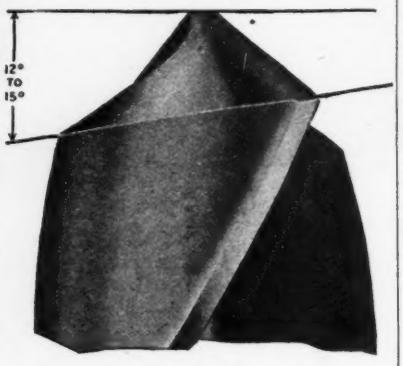
EDUCATIONAL DEPARTMENT

ROCHESTER, N. Y.

What is the Correct Angle of Lip Clearance?



Proper Lip Clearance
Note how much lower the heel line "B" is than the cutting lip line "A." This difference is the measure of the clearance.



Showing the proper way to grind the surface back of the cutting lip. The angle indicated is the angle *at the circumference of the drill.* This angle should be *increased,* however, as the center of the drill is approached.

DO YOU, yourself, know the correct angle of lip clearance for a twist drill?

As elementary as it sounds, it is surprising the large number of really experienced men who can be "caught" on this simple question!

If the experienced man frequently doesn't know this vital requirement of a drill point, you will realize how important it is that your students learn it EARLY—and remember it thereafter.

This, and a number of other things about twist drills and drilling practice, will be found in the "Handbook for Drillers," copies of which (in any reasonable quantities) will be cheerfully sent to Vocational Directors and Instructors for the use of their classes.

The CLEVELAND TWIST DRILL COMPANY CLEVELAND NEW YORK-CHICAGO-LONDON

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

Manufacturers of Carbon and Cle-Forge High Speed Drills for every purpose; "Mezzo" Super-Carbon Drills; Hand, Jobbers' and Shell Reamers; "Peerless" High Speed Reamers; "Paradox" Adjustable Reamers; "Quick-Set" Reamers "Spirex" Machine Taper Pin Reamers; Chucking Reamers for Turret Lathes; Counterbores; Countersinks; Sockets; End Mills; and the "Ezy-Out" Screw Extractor.

(Continued from Page 28a)

of tools and machines is required so that the work can be introduced in any small school.

Plain and Ornamental Lettering

E. G. Fooks. Boards, 88 pages. Price, $1. Isaac Pitman & Sons, New York City.

Forty lettering plates, leading the student from the simplest light line letter to an application of the Trojan alphabet to an inscription, make up this book. A number of interesting plates are devoted to rapid single stroke letters made with square nibbed lettering pens. The book will be useful for reference in every school library.

Lettering Sheets

By Horace E. Boggy, Arsenal Technical High School, Indianapolis, Ind.

These sheets are a decided departure from any existing aids for teaching lettering. They measure 10"x14", and are divided into two parts. The upper half consists of the alphabet with ample space to the right of each letter for practicing every letter a dozen times. The lower half is ruled for any exercise which the teacher may desire to give. Both slant and vertical editions are provided. The guide lines are such that the student will get the feel of the letters and will have ample opportunity for practicing them. The sheets appeal to us as very practical for beginning mechanical drawing classes.

The Tree Folk

By Henry Turner Bailey. Paper, 31 pages, 14 plates. Illustrated. Price, $2.00. Published by Washburn & Thomas, Cambridge, Mass.

The well known exponent of art education, Henry Turner Bailey, has turned his attention in this book to the subject of trees. It is needless to say that his viewpoint is not that of the botanist or the biologist, but of the artist. He proceeds in this book to tell many wonderful things about plant life. There is the nut tree, the fruit tree, the shade tree—all with their most interesting characteristics of form, color, and shade, and all at the service of mankind.

But, the author teaches us much about the beauty of trees, their form, their verdure, and their color. We can't agree with his quaint conceit of the soul of trees; that is, a bit of artistic poetizing that is beyond some of us who are practical minded even in art. He quotes the poet who said: "Pictures are made by fools like me; but only God can make a tree," and in this exalted spirit he deals with his subject. The book is liberally illustrated.

Furniture Suggestions

By C. L. Goodridge. Price, $1.25 per set. Published by C. W. Goodridge, Dorchester, Mass.

These "suggestions" consist of a set of accurate blue prints covering typical problems in furniture construction. In all, 24 problems are listed, including a taboret, a battery cabinet, an umbrella rack, a shoe shining stand, a smoking stand, a bookcase, a pedestal, a costumer, a medicine cabinet, a desk, a record cabinet, and other similar problems.

The problems are predominantly of the straight-line type, simple in outline and construction, and well suited for classes in furniture construction.

Automotive Electrical Practice

Ray F. Kuns. Cloth, price, $3.50. Bruce, Milwaukee.

This book has been prepared to meet the needs of those desirous of securing a practical working knowledge of storage batteries and the electrical equipment carried by motor cars.

The book deals with the specific problems arising in service stations and also with farm lighting, radio batteries, storage batteries, starting, lighting, ignition, signal work and other types.

The book includes all necessary information for apprentices and practical workmen in such form that the student who masters the fundamental or underlying principles of design, construction, and operation will be able to handle any specific problem in a skilful manner.

The author, as principal of a large automotive trade school in Cincinnati, has had extended experience and training, fitting him to write authoritatively on the subject. He presents his material in a clear and interesting manner, keeping in mind the needs of students and the work to which they aspire.

The material is all given in 22 chapters, and a glossary and complete index have been included for the convenience of the reader. The book should find wide acceptance among automotive shops and trade schools teaching the subject as an effective means of training in a popular vocation.

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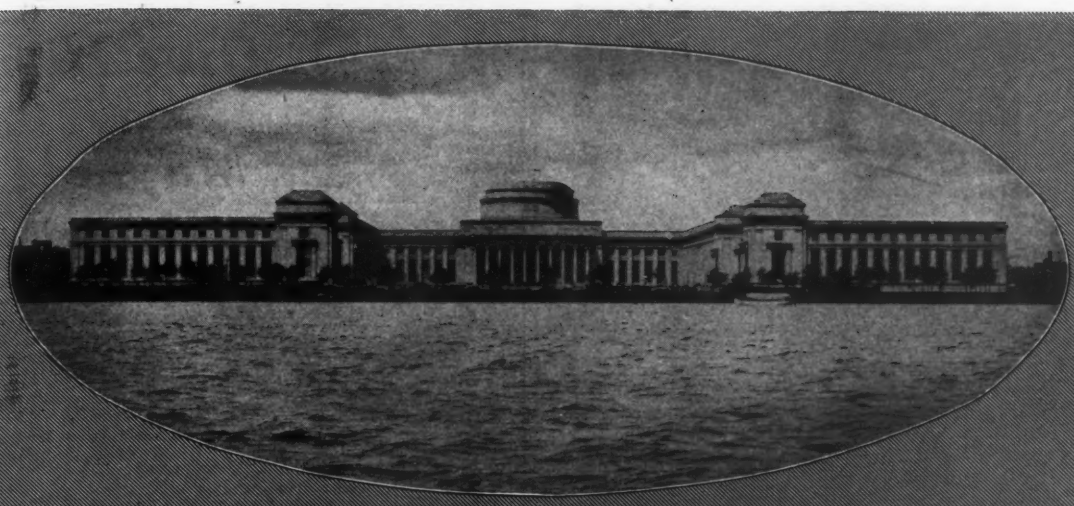
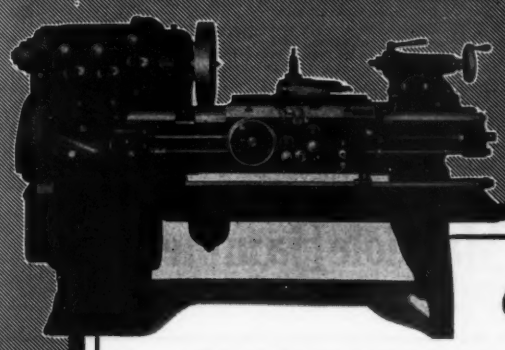




and now —

The Massachusetts Institute of Technology uses The

MONARCH Helical Geared Ball Bearing LATHE

as a part of their Metal Working Equipment.

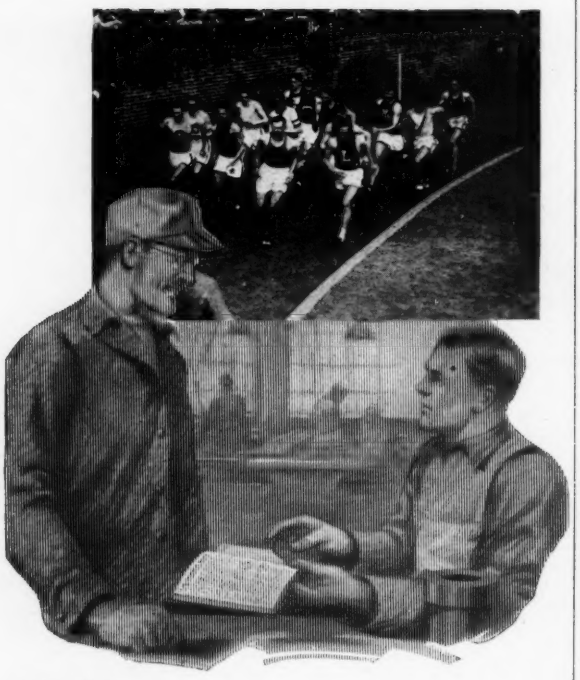
The prestige of this Institute—the corner-stone of Massachusetts' enviable system of vocational education — attracts students from the four corners of the civilized world.

In choosing the equipment for these students, the directors of the Institute must base their choice upon equipment that will give students the greatest possible amount of experience.

We are proud of the selection of the MONARCH Engine Lathe as a part of the Institution's metal working equipment — proud that it has been selected solely upon its merit, after careful consideration, as the type of equipment necessary for the high degree of training which Massachusetts "Tech" gives to its students—a training which has been so creditably reflected on the Institution by its graduates.

We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

THE MONARCH MACHINE TOOL COMPANY, 404 OAK STREET, SIDNEY, OHIO.



Off to a good start—

Getting off on the right foot—starting with good tools—is just as important in work as in sport.

A really good man—in sport or work—can sometimes come out from behind and win, but any disadvantage in those first few strides makes a heavy handicap for the best of them.

If you've a young fellow—a son, a friend, or an employee—who is just beginning to use tools, *start* him *right*. Give him a Starrett Apprentice Set, No. 901. Accuracy in the tools he works with is pretty sure to teach him accuracy in the work he does.

The No. 901 Set, in a handsome wooden case, contains a 6 in. Combination Square, 6 in. Flexible Steel Rule, Center Punch, Center Gage, 5 in. Divider, 6 in. Outside and 6 in. Inside Calipers and the Starrett Book for Machinists' Apprentices—184 pages on how to use tools and how to do good work.

Ask your dealer. Also, write us for a free copy of the 352 page Starrett Catalog No. 23-CE.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes — Standard for Accuracy
ATHOL, MASS.

151

Starrett Sets

Give Him a Maydole Hammer

For his sake — every Maydole Hammer is the result of eighty-three years of specialization in the making of fine hammers. It teaches the young craftsman to appreciate fine tools because it's the tool he uses most.

For your own sake — Maydole heads are press-forged of tool steel; handles are of clear, second-growth hickory, air-dried and put on "for keeps." Maydole Hammers will stand far more use or abuse than any ordinary hammer. They are the most economical you can buy in the long run.

Ask your dealer, and let us send you Catalog, and Pocket Handbook 23-H.

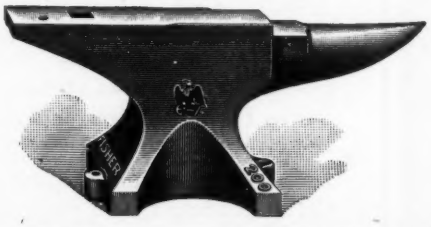
Maydole Nail Hammer

THE DAVID MAYDOLE HAMMER COMPANY
Norwich New York

Maydole Hammers 34

THE "EAGLE" ANVIL

The standard anvil for Schools. No deafening ring. Lessons given and heard without interference.



A DECIDED PREFERENCE FOR USE IN MANUAL TRAINING SCHOOLS

— A FEW OF THE MANY USERS —

Tilden High School, Chicago, Ill.
Manual Training High School, Brooklyn, N. Y.
Bushwick High School, Brooklyn, N. Y.
Camden High School, Camden, N. J.
Lawrence High School, Lawrence, Mass.
Mass. Institute of Technology, Boston, Mass.
Mechanics Arts High School, Boston, Mass.
Rensselaer Polytechnic Institute, Troy, N. Y.

Manufactured Since 1843 by the Eagle Anvil Works

FISHER & NORRIS — TRENTON, N. J.

(Concluded from Page 30a)

Administration of Vocational Education

By Arthur F. Payne. Cloth, 354 pages. Price, $3.00. McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York.

This book is very largely an explanation and interpretation of the state systems of vocational education as set up under the control and aid of the Smith-Hughes law. Considerable space is devoted to rules, regulations, and pronouncements of the federal board, and perhaps we shall find that chief value of the work in this systematic and unified statement. The reviewer is inclined to feel that the author's social philosophy is rather narrow and utilitarian and his philosophy of vocational education too broad to justify itself—in the terms of our federal laws and subsidies which he describes.

Design Plates

By Sara Cohoon. Size 9"x12" in envelope. Price, 35 cents. The Bruce Publishing Company, Milwaukee, Wis.

These twelve plates are intended to aid children in developing natural forms into typical design forms. Common wild plants are used and illustrations are given of the development of triangular, circular, and square units, surface patterns, corner patterns, borders, and holiday designs. The work has been widely used in the author's classes at Springfield, Massachusetts.

White Collars, an Industrial Fantasy. By M. C. Richmond, Atlantic City, N. J.; 25 pages, paper. Consists of a vocational play in prolog and three acts. The play has for its chief purpose entertainment, yet it is intended to both arouse and enlighten parents, and to aid in the problem, "What Shall I Do with My Boy?" It presents the story of a young man, engaged in a "white-collar job," and who found the collar pinching him too much. He yearned for freedom and he got it by entering a trade.

NEWS AND NOTES

Rating of Teachers. At a recent meeting of the teaching staff of the manual training department at Grand Rapids, Mich., the matter of teacher rating under supervisory control was thoroughly discussed. A committee was appointed to draw up a plan or rating sheet, by means of which the supervisor may keep a record of the merits or demerits of every instructor in the various departments under his supervision.

A form was agreed upon and adopted by the director. The items in the rating sheets are divided into two main divisions, majors and minors, and each of the divisions has subdivisions. It is essential that principals and supervisors cooperate closely on the three first divisions under professional attitude, while the balance of the rating program is left quite generally to the personal contact of the supervisor with the individual instructor. The rating sheet as adopted is as follows:

MANUAL TRAINING RATING SHEET

Name..... .....192...
School..... Grade.....Hour.....
Rating.....

NOTE—Two markings in checking column: × = failure; + = passing. For satisfactory rating—eight majors and five minors.

Majors	Observations
	Regularity of Attendance.....
1	Punctuality.....
Professional	Co-operation.....
Attitude	Self Improvement.....
2	Self Control.....
Discipline	Class Control.....
	Use of English.....
3	Knowledge of Subject Matter.....
Instructions	Definite Planning of Work.....
	Presentation.....
	Class Spirit.....
Minors	
	Personal Appearance.....
1	Use of Voice.....
Personal	Tact.....
Attributes	Courtesy.....
	Sympathy.....
	Neatness of Shop.....
2	Condition of Equipment.....
Routine	Ventilation.....
	Accuracy and Promptness of Reports.....

Free

THIS VALUABLE BOOKLET

an aid to *instructors* tells how to select use and care for BITS!

Manual training instructors will find this illustrated 48-page booklet a real help in promoting class interest and an appreciation for good tools.

Between its covers is a wealth of interesting and authoritative data based upon 41 years' experience in the bit making industry.

There are detailed illustrations showing how bits are forged and machined, the parts of a bit and their functions, how to sharpen a bit properly, how to re-straighten the twist, and how the design of the cutting head is varied to meet the requirements of different classes of work.

Please return the coupon and we will be glad to mail you a sample copy free of charge.

THE IRWIN AUGER BIT CO.
WILMINGTON OHIO

Largest Makers of Wood-Boring Tools in the World.

THE IRWIN AUGER BIT CO.,
WILMINGTON, O.

Please send me a sample copy of booklet, How to Select, Use and Care for Bits.

Name.....

School.....

City and State.....

What Kind of Vise does your shop need?

The Columbian Line of Vises offers the widest variety of models and sizes. There's a Columbian Vise to fill every need.

COLUMBIAN Woodworkers' Vises are standard equipment for manual training work. Quick action or continuous screw models.

DROP Forged Steel Clamps eliminate twisted or broken "C" Clamps in your shop. Sizes from 3 to 10 inches.

COLUMBIAN Machinists' Vises of malleable iron are practically unbreakable and embody many unusual features.

COLUMBIAN Steel Forged Leg Vises are made to stand rough treatment.

COLUMBIAN Swivel Base Machinists' Vises are popular because the vise may be turned to hold the work at the most convenient angle.

COLUMBIAN malleable iron hinged pipe jaws are carefully milled and tempered to stand hard usage.

IN THE Columbian Combination Pipe and Machinists' Vise, the tool steel pipe jaws are removable and interchangeable. This exclusive Columbian feature gives the advantage of two styles of vises in one tool.

Illustrated price list sent on request.

THE COLUMBIAN VISE & MFG. CO.
Successors to The Columbian Hardware Co.
CLEVELAND, OHIO.

COLUMBIAN VISES

TRADE MARK—REG. U. S. PAT. OFF.

Vocational Courses at Akron. The school board of Akron, O., has approved the establishment of vocational courses in the schools, provided the money can be obtained for the courses. The committee in its report, stated that the holding power of the schools is far below the average for the state, and that the vocational courses are needed to encourage longer attendance and to train pupils to learn a vocation.

Among the seventeen recommendations of the committee are the following:

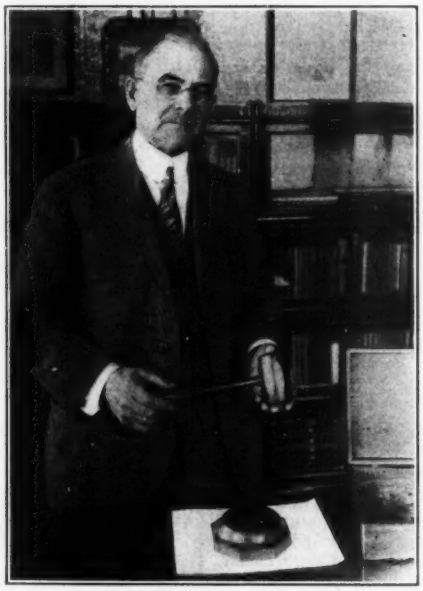
It is planned that the first six grades shall be organized to provide intensive training preparatory to vocational training, and that the seventh to the ninth grades offer opportunity to pupils to gain a knowledge of the important industrial and commercial subjects.

The committee recommends the establishment of a two-year course in salesmanship for the eleventh and twelfth grades, a printing course as an exploratory and vocational subject, evening trade courses in carpentry, plumbing, sheet metal work, bricklaying, electricity and auto-mechanics, and short courses to meet the vocational needs of different groups of students who complete the eighth grade.

It is recommended that the continuation school plan be extended to meet the needs of working boys and girls under 18 years of age, and that students of the high school be offered a course in auto-mechanics. The elementary principles of business will be offered to pupils of the seventh to the tenth grades, with intensive training in commercial courses for the students of the eleventh and twelfth grades. Special courses pertaining directly to home making will be offered to girls of the seventh to the ninth grades, and intensive courses to students of the high school upper classes.

Agriculture Needs Trained Boys and Girls. According to Secretary W. M. Jardine of the U. S. Department of Agriculture, agriculture is in need of college-trained farm boys and girls. The enrollment in agricultural courses diminished 26 per cent from 1914-1915 to 1925-26. It is found that the enrollment in agriculture has fallen but that the enrollment of country boys and girls in all courses has dropped. The cities and the towns furnish college and university enrollments. The nation, it is urged, needs the wholesome influence of well-trained rural youth and country boys and girls are entitled to as good training as city boys and girls.

Continuation School for Harlem. The New York City board of education has organized a continuation school for Harlem. The school will draw its membership from 2,400 working pupils of the east side, mainly girls living north of Twenty-third street.



SUPT. R. J. CONDON, CINCINNATI, AND THE GAVEL.

The industrial-arts department of the Cincinnati, Ohio, schools has in various years honored the president of the Department of Superintendence of the N. E. A. by making and presenting a gavel and block to be used during the convention and to be retained as a permanent reminder of the meeting. In February last at Washington, Dr. Frank Ballou was presented by Superintendent Condon with a gavel and block that ranked high in significance to a school administrator.

The gavel is constructed of wood taken from a table in a laboratory at Antioch College, Ohio, used when Horace Mann was president of Antioch. The block is of hardwood taken from a bedstead used by Horace Mann.

Both block and gavel were turned in the industrial arts department at the Woodward High School as was also a mahogany box constructed to hold the gavel, etc.

(Concluded on Page 36a)

Have You a Little Paper in Your School?

The School News

A facsimile of the front page of a schoolpaper, such as may be published for the purpose of convincing parents of your children of the value of printing in connection with academic and vocational instruction in public schools.

VOL. 2 — ANY COMMUNITY, ANY STATE — NO. 1

The Value of Schoolpapers

WHAT the newspaper is to the general community the schoolpaper is to the school community. Both publications possess uncommon interest to their readers by the printing of news items, and both have the power of moulding public opinion. One influences mature minds; the other influences the youthful minds. Both are informative and highly educational. Especially is this latter statement true in the case of schoolpapers.

The schoolpaper has one distinct advantage in educational value—it is the product of its readers. To be successful it must represent the combined effort of every class in the school and be of interest to every student enrolled in those classes. The academic classes may be assigned the task of collecting news, preparing interesting articles, and revising the printers' proofs for errors in English construction, spelling and typography; the art classes may have charge of the illustrations and general typographic arrangements; the commercial classes may look after the business end of the publication, such matters as soliciting money for subscriptions or advertisements, making disbursements for paper, inks, etc. The actual work of type composition, imposition, presswork and binding will be done by the printing classes.

No other activity can combine into a single educational unity practically the entire facilities of the institution as does the schoolpaper.

With the installation of printing instruction in a school all the academic work is revitalized. English, spelling, arithmetic, grammar, and art will take on a different meaning to students who have hitherto regarded these studies merely as necessary evils. Taught in conjunction with printing, their great value as vital elements of education is realized.

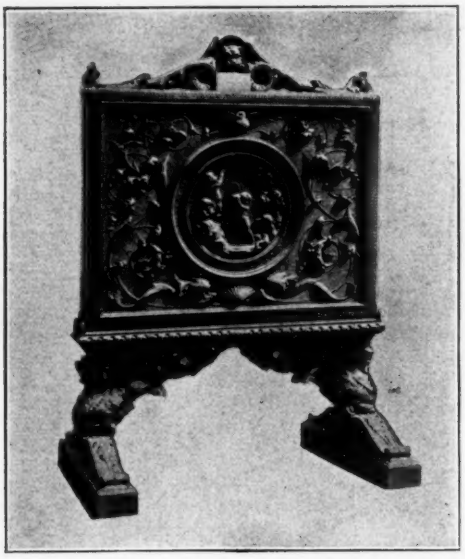
Request us to send you a chart showing the "Mechanics of Journalism." It is free.

Information: The Education Department of the American Type Founders Company employs the services of professional educators, efficiency engineers and trained salesmen to aid you in establishing printing courses in your schools. With this Company the word "service" is spelled H-E-L-P.

For information write F. K. PHILLIPS, Manager, EDUCATION DEPARTMENT

American Type Founders Company

300 Communipaw Avenue, Jersey City, New Jersey



Florentine style walnut portfolio carved by Frullini, 19th century—from "The Story of American Walnut"

For Woodworkers

A book about walnut and its uses

"THE Story of American Walnut" describes the use of walnut through the ages, tells you about the historic periods of furniture in which walnut plays so tremendous a part, shows you how to recognize genuine walnut furniture and avoid the spurious, and gives other valuable information on this beautiful wood.

The chair or other article that a pupil makes should be of a wood worthy of his craftsmanship. If made of walnut, it will be a lasting tribute to his skill and deserving of the pride he takes in it. Boys will gladly pay the small extra cost of walnut.

Send for "The Story of American Walnut" and keep it where your pupils may refer to it. For your convenience, we offer a coupon which filled in and mailed will bring you a copy.

AMERICAN WALNUT

"THIS IS THE AGE OF WALNUT"

American Walnut Manufacturers' Association
Room 1256, 616 So. Michigan Ave., Chicago
Please send

"American Walnut for Interior Woodwork and Paneling" .....

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I. A. 10-26

(Continued from Page 34a)

Summer Courses at Oswego, New York. Some successful summer courses in industrial education and vocational guidance were given recently at the summer session of the Oswego Normal School from July 6th to August 13th. A total of 329 students were enrolled in these courses, most of whom were from various sections of New York State, with several from adjoining states.

Among the courses offered were those in the history, theory, principles, and problems of vocational education by Mr. William J. Small, Niagara Falls; trade and occupational aptitude testing, and occupational training opportunities, by Mr. T. W. Langenbahn; principles of teaching and class management, and organization and teaching of trade shopwork, by Mr. Donald B. Kidd, Syracuse; types of vocational education, by Eugene D. Fink, University of State of New York, Albany; industrial history, by Mr. R. W. Fleming, of the University of the State of New York; organization and teaching of industrial arts in the high and part-time schools, and practicum in industrial arts, by Mr. G. E. Hutcherson; the theory, principles, and problems of part-time education, by Mr. Wm. B. Regan, Buffalo; industrial arts design and blackboard sketching, by Mr. G. K. Gombarts, New York City; vocational guidance, Mr. Anthony M. Goldberger; the study of industries and trade analysis, by Mr. George M. Quackenbush, Buffalo; organization and teaching of required subjects in part-time schools, by Miss Mary W. Muldoon, Waverly; study of industrial occupations, by Miss May Rogers Lane, Cleveland.

Among the distinctly shop courses were the following: Automobile mechanics, Mr. Truman G. Dell, Elm Vocational School, Buffalo; printing, Mr. Jay D. Rudolph, Oswego; electricity, Mr. Harry M. Karcher, Oswego; machine shop, Mr. Ranson I. Libby; sheet metal, Mr. Marion S. Trew, Rochester; mechanical and architectural drawing, Mr. Wadsor M. Scoville, Oswego; carpentry, house construction, roof framing and stair building, Mr. Richard M. Van Gaasbeek, Brooklyn; cabinet making and wood finishing, Mr. F. O. E. Raab, Rochester; shoe repairing, Mr. Albert E. Schaupp, Rochester.

The course in foremen training, given by Mr. Arthur L. Mann, of the University of the State of New York, Albany, was well attended.

In addition to summer courses in the field of industrial education, a strong program of courses in the regular normal department was offered. The instructional staff included experts from various parts of the state. Dr. J. K. Flanders was in charge of the school, and Mr. William J. Knight, of Syracuse, was camp director.

Starts Building Trade Course. The board of education of Falls City, Neb., has established a general industrial class in the building trades as a part of the day school program for the next year. The course will be taught by Mr. R. E. Hunter, a practical journeyman carpenter with ten years' experience.

It is planned to admit to the course boys from any of the four high school classes, from the freshmen to the seniors; the basis of admittance will be a careful consideration of each boy's interests, aptitudes, desires, age, probable educational expectancy in high school, future vocational plans, etc.

The course will prepare boys for successful entrance into one of the building trades as advanced learners, and will at the same time, give an opportunity to continue a part of the high school program. It will not turn out accomplished tradesmen but will give the boys in a selected group enough knowledge relative to fundamental trade processes and materials of construction to enable them to enter upon some building trade as an advanced learner.

Vocational Guide. An important part of this fall's Exposition of Women's Arts and Industries in New York City will be an attempt to help New York high school girls to choose their careers. The exposition will be held in the Hotel Astor, beginning with September 27th and four days have been set aside for the event. Each afternoon representative business and professional women will talk on their careers, with the idea of showing the businesswomen of the future what fields are open to them and how they may best set about entering them.

Earn and Learn Plan Proves Popular. Advance registration figures show that more than 700 high school students in New York City have selected the cooperative industrial course in the five city high schools. This is the largest number of students on register since the classes of ten high schools offering cooperative courses were consolidated in 1920.

The plan of having high school students spend alternate weeks at school and in employment is spreading. It will be extended to a group in Theodore Roosevelt High School this fall. The plan was inaugurated in 1914 and has been extended gradually into other schools since that time. It was extended to the Bushman, Newton and Julia Richmond high schools in the last two years.

Reduce Budget of Schools for Young Workers. A sweeping reorganization of the continuation school system of New York City has been recommended to the board of education of that city by the committee on finance and budgets. After a careful study of the needs of the schools as presented by Director M. E. Siegel, the committee voted to allow a total of $1,517,386 for paying the salaries of the instructional staff in the continuation schools next year, as against an appropriation of $1,519,424 this year. Despite a decrease of $2,038, the budget is based on an increase in registration of 12,000 pupils between October, 1926, and October, 1927.

Mr. Arthur S. Somers, chairman of the budget committee, has declared that the continuation school system needs reorganization on a sounder basis. The recent survey criticized the administrative organization of these schools and caused the budget committee to look very closely into the items of teacher organization, pupil period load, etc.

(Continued on Page 38a)

NEW CATALOG

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WE CARRY THE WELL KNOWN "KERN" DRAWING INSTRUMENTS

(Continued from Page 36a)

On the basis of the facts, the committee voted to allow thirteen supervisory teachers and thirty regular teachers to take care of a 4,000 increase in pupil register in the fall of 1926, thirty positions also were allowed for the estimated increase of 4,000 pupils in the spring of 1927. The committee also included 43 teachers for the reduction of the pupil load in the shops, many of which are above normal capacity.

—Cranford, N. J. The school board will shortly decide whether art and sewing are essential to a grammar school education and whether failure to pass in one of these subjects prevents the award of a diploma of graduation.

Mr. M. H. Shirer of Cranford, whose daughter, Pauline, did not receive a diploma with other members of her class, has asked the board of education to pass on the matter. The schools of Cranford are the only ones in the country to hold final examinations in art and sewing. The passing mark is 65 in place of the customary 75 required in other subjects.

Act to Retain Shop Work. Plans under consideration by the educational department of the Chicago school board to abolish or reduce to a minimum shop work in all high schools other than those devoted to technical courses brought a sharp protest from high school principals in the form of a letter to Supt. William McAndrew.

In the letter, the principals charged that the data collected as to wastage and small classes in shop work in regular high schools were misleading. They further declared that they were never consulted about the change. It was held that as the educational experts of their school districts, the principals should be called in for consultation upon problems affecting the management and policies of the schools.

Vocational Schools Have Exhibit. The vocational department of the Pennsylvania Reformatory at Huntingdon, Pa., during the latter part of June, held an industrial exhibit. The exhibits were arranged in the main office and the industrial departments and afforded the visitors an opportunity of witnessing some of the practical results accomplished. There were displays of the work in printing, bookbinding tailoring, machine shop practice, foundry work, bricklaying, carpentry, sheet metal, auto mechanics, blacksmithing and baking.

Hold Fourth Annual Conference. The fourth annual vocational conference of Kansas Vocational teachers was held July 14th to 17th at Pittsburg. Pres. W. A. Brandenburg of the State Teachers' College presided.

Continuation Schools Under Fire. A definite change in the equipment and administration of the New York City continuation school may result as the outcome of a series of charges made by Mr. E. W. Edwards chairman, of the committee on education of the New York State Federation of Labor, who asserts that these schools for young workers were badly neglected by both city and school officials during the preceding administration. One outcome, it is expected, will be the appointment of a committee to survey the continuation schools.

The charges are, in brief, that the continuation schools are housed in poorly equipped loft buildings; that most of the teachers are substitutes, without adequate training; that there is no plan for the licensing and no definite salary schedule for the teachers, and that no satisfactory plans of organization or courses of instruction have been worked out. Of the eleven continuation schools now functioning only one, it is asserted, has anything like adequate equipment. This is the Central Continuation School of the Printing Trades, which is largely supported by employers of the students and by labor organizations.

Plan Vocational School. A vocational school for Westmoreland, Kansas, will be ready by September first. The building will house both classroom and shop. It will be in charge of Mr. H. L. Collins.

New Farm Shop Building. The rural high school at Linwood, Kansas, plans to erect a new farm shop building. Mr. Austin Heywood is in charge of the school work.

Open Placement Bureau. A placement bureau has been opened at Berkeley, Calif., in cooperation with the United States Employment Service. An endeavor is made to select the proper type of individual to fill the specific position. The bureau is under the direction of Mr. D. H. Biery, of the Berkeley school department. More than 100 high school graduates have been registered with the employment bureau.

Vocational Teaching Has Rapid Growth. Vocational agriculture was taught to 4,500 high school boys in 175 rural communities in Ohio during the past year. It is estimated fifteen vocational departments will begin when school opens this fall.

The first high school work in vocational agriculture in Ohio began in 1918. In eight years it has grown from nineteen departments to 190, with 90 per cent of the total enrollment farm boys. There remain only fifteen counties which do not have at least one department in their high schools.

Vocational Courses for Railroad Men. Under a cooperative plan proposed by the Union Pacific Railway Company, the high school at Marysville, Kans., will offer a special vocational course for locomotive engineers, firemen and maintenance men. The course will enlarge the curriculum of the high school and will afford an opportunity for firemen and maintenance men to receive instruction supplementing their daily employment and preparing them for promotion.

Enlarge Vocational Work. The school board at Altoona, Pa., has announced that it will enlarge and improve the vocational

(Continued on Page 40a)

A Heartening Sight for Art Teachers!

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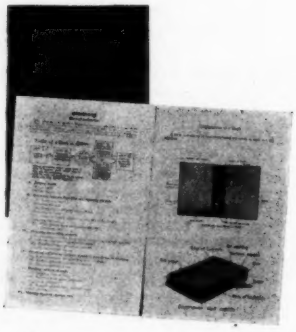

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(Continued from Page 38a)

work to be offered during the new school year. A large amount of new equipment will be installed. Mr. C. C. Sadler, vocational director, will be employed for the full twelve months, in order that he may devote more time to the work during the summer period.

Plan Trade School. The school board at Lewiston, Me., plans the establishment of a trade school for the fall opening of school. Carpentry will be taught as one of the subjects. It is also planned to aid high school graduates who do not intend to go to college.

Failed Students Succeed in Vocational Work. To give a second chance to failing students, a county-wide probationary-promotional experiment was inaugurated last year in Coshocton County, Ohio. Boys of the eighth grade who failed were allowed to take the Smith-Hughes course and enroll for high school work, electing any vocational department in which they showed interest or ability. All who entered under the arrangement completed the ninth grade vocational work.

Continuation Pupils Required to Select Life Work. Each boy in the continuation school at Schenectady, N. Y., is required to fill out a blank, which has been distributed to the director of the school in connection with the life plan work of each boy seeking some particular vocation in life. Filling out a blank gives some idea as to what each wants to follow in the line of work, how he is best qualified to do this kind of work, and later, if the boy has the inclination, to continue and learn some trade or become engaged in some particular occupation in which he may have ability.

New Type of Trade School. A trade school, the first of its kind operated by a board of education, will be opened at Cleveland this fall in conjunction with labor unions and employers, and with the cooperation of the board of education. The course will include the building trades, auto mechanics, and machinists' trades. Pupils will spend four hours a week in school, for which time they will be paid by their employers at the regular rate of pay, the remainder of the time to be put in at the shop.

Vocational Courses. Courses in the building trades and Smith-Hughes home economics work have been inaugurated at Marine City, Mich.

Laundry Course. A vocational course in laundry work is offered for the second year by Mechanics Institute, Cincinnati. In 1925-26, 31 young men successfully completed the course which is fostered by an organization of laundry workers.

The summer session at Stout Institute, Menomonie, Wisconsin, opened June 21st. The total attendance was 425, of which 148 are women and 277 men. This enrollment of men establishes the sixth consecutive attendance record of men for the Stout Institute summer session.

The enrollment includes teachers of industrial and household arts from most of the states in the Union. A series of special auditorium assemblies have been arranged with special speakers, the list including: Marjorie Daw Johnson, John Guy Fowlkes, A. H. Edgerton, John Callahan, C. A. Prosser, and George P. Hambrecht.

Indiana Directors' Conference. The annual conference of state directors and supervisors of vocational education in Indiana was held July 8th and 9th, at Purdue University, LaFayette, Ind. Mr. H. G. McComb of Purdue University, acted as chairman of the opening conference. Among the speakers were Mr. C. D. Rotruck, of Anderson, who talked on "The Anderson Cooperative Plan;" Mr. F. S. Barrows, of Hammond, who discussed "Suggestions for the Spring Round-Up;" Prof. Ammon Swope, of Purdue University, who talked on "Plans for Teacher Training;" Mr. Sylvan Yager, of Terre Haute, who talked on "The General Shop Plan," and Mr. John H. Chambers, of Indianapolis, who discussed "The Union Plan for Training Apprentice Printers." There were also addresses by Mr. K. G. Smith of Lansing, Mich., Mr. Geo. P. Hambrecht of Madison, Wis., and Mr. O. H. Day of Kansas City, Mo.

Illinois Society to Affiliate with American Vocational Association. The Illinois Society for Vocational and Practical Arts Education will hold a meeting at the Auditorium Hotel, Chicago, on Friday and Saturday, November 26th and 27th, to take steps toward the formation of a state organization of teachers, school officials, industrial executives and others interested in the promotion of vocational and practical arts education. A convention committee and a number of special committees have been appointed to represent the various interests which will combine to form the organization.

The arrangements provide for two general sessions, a banquet session and two sectional conferences. At each of the conferences there will be a round table discussion of timely and practical subjects. At these conferences, each of the committees will be in charge, and they will suggest the speakers for the general sessions. Convenient space has been arranged for the commercial exhibits.

National Association to Meet in Dallas. The Vocational Education Section of the National Education Association will hold its next meeting in February, at Dallas, Tex. Mr. N. S. Hunsdon, director of industrial education, Austin, Tex., is secretary of the department.

Miss Griselda Ellis, principal of the Girls' Vocational School at Newark, N. J., has retired because of ill health. Miss Ellis resigned after a service of twelve years. She had a high reputation as a vocational instructor and director and the success of the school was credited to her ability.

(Concluded on Page 43a)

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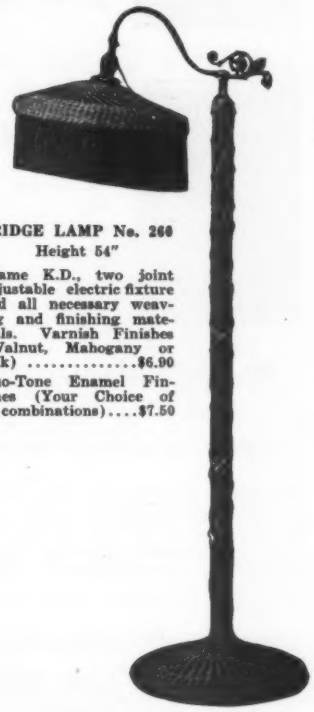

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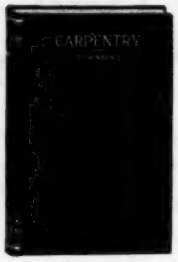

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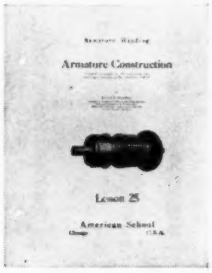

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(Concluded from Page 40a)

Evening Class for Bricklayers. An evening class for bricklayers at Wichita, Kans., proved a success the past winter. Six men were graduated into out-of-town jobs at $11 per day.

Unit Courses in Trade. The Kansas State Teachers' College at Pittsburgh, Kans., has compiled an extensive list of the short units of instruction which may be profitably offered in evening classes. Among the more important subjects in the list are auto mechanics, bricklaying, carpentry, electrical work, furniture factory work, interior decorating, machine shop work, painting, and paperhanging.

Offer Vocational Courses. The new Thornton Township High School, at Harvey, Ill., will offer a variety of courses in industrial arts, including electricity, automobile mechanics, cabinet making, pattern making, mechanical drawing, machine shop work, sewing and domestic science.

Opportunity School for Boys. An opportunity school for boys has been successfully operated at Durant, Okla., the past year. A total of seventeen boys were enrolled the first of the year, most of them from the fifth and sixth grades.

NEWS FOR BUYERS

Blue Print Information. A vast amount of information on blue printing and the value of blue prints has been collected recently by the C. F. Pease Company and published in a special newspaper designated "The Slogan News." While the immediate reason for the publication of the paper is the printing of the results of a slogan contest on blue prints and their value, the paper contains a series of news articles and discussions of methods of blue printing, the use of blue prints, and the possibilities of new uses for blue prints. Copies of "The Slogan News" will be sent to any teacher upon request to the North Franklin Street factory, Chicago.

Saw-Kerf. The caption of this paragraph is the title of a new quarterly magazine which E. C. Atkins & Company of Indianapolis are publishing. The first issue contains an interesting story of the beginnings of Mr. E. C. Atkins house, his early struggles and persistence, and the establishment of the great Atkins Silver Steel Saw works at Indianapolis. It will be the purpose of the new publication to present from time to time valuable material on forestry, the utilization of wood, practical methods of using and maintaining saws, etc.

Issue Booklet on Bits. The Irwin Auger Bit Company, Wilmington, O., has issued a booklet, entitled "How to Select, Use and Care for Bits." The booklet contains a great deal of practical information which will be found useful to those who use bits only occasionally. It gives facts about the sizes of bits, screw points, spurs, cutting lips and clearance, on how to use a bit, and how to care for it. Descriptions are given of the different kinds of bits and their uses in special jobs.

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"Messrs. Richmond and Littlejohns's book which concerns only the craft of the water-colorist is a repertory of experiment well illustrated by color plates . . . The survey is thorough and to a water-colorist who has already achieved with reasonable proficiency personal habits the book should usefully serve its purpose."—*The Saturday Review of Literature.* (New York.)

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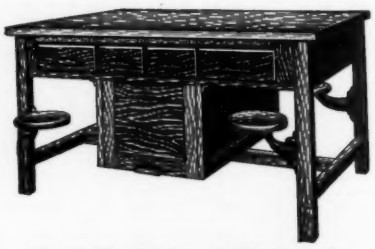

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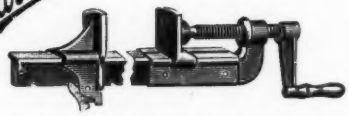

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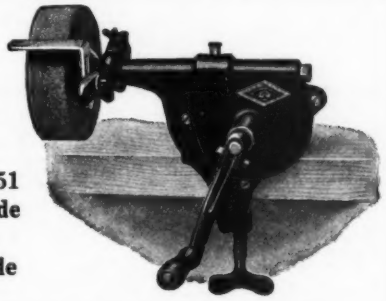

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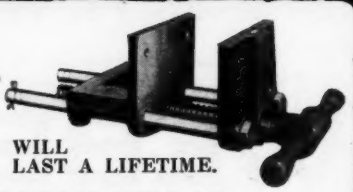

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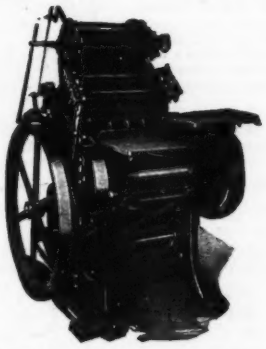

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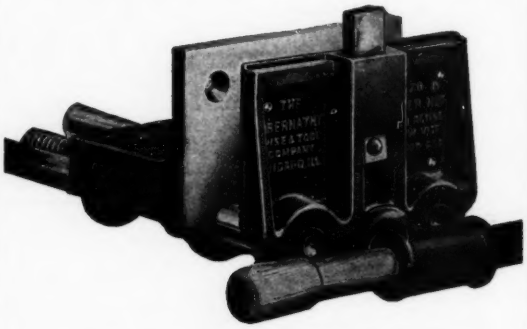

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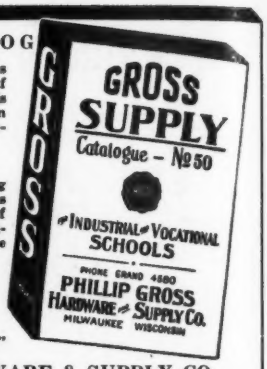

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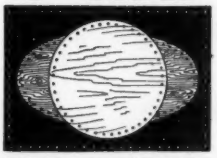

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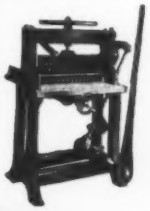

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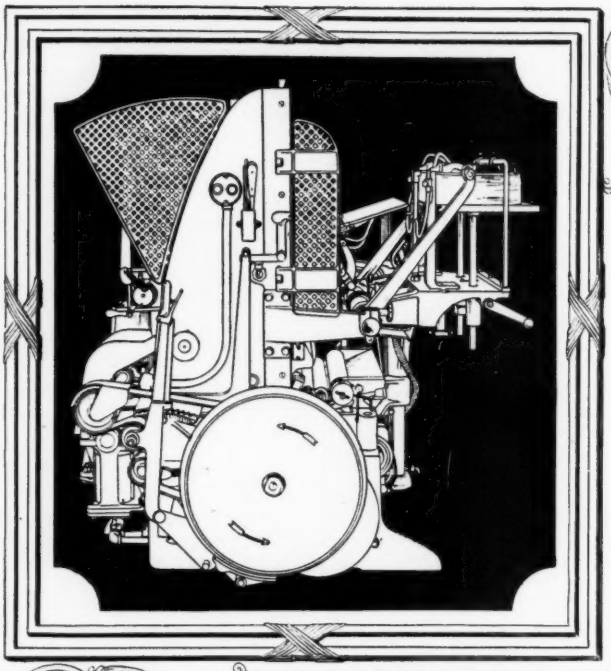
GRAMMAR A PRACTICAL TRADE SPEED

Chandler & Price



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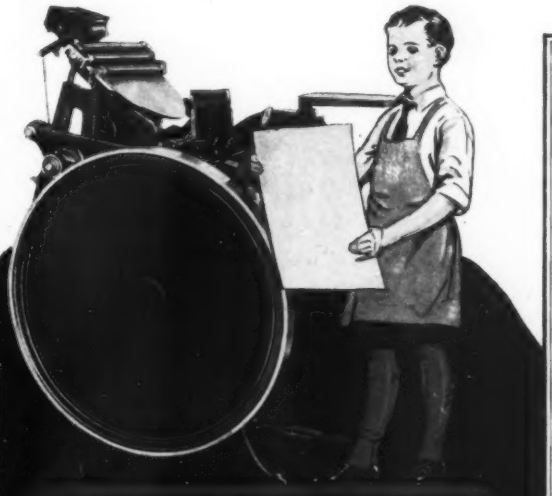

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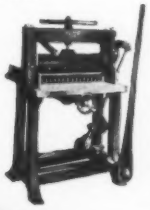

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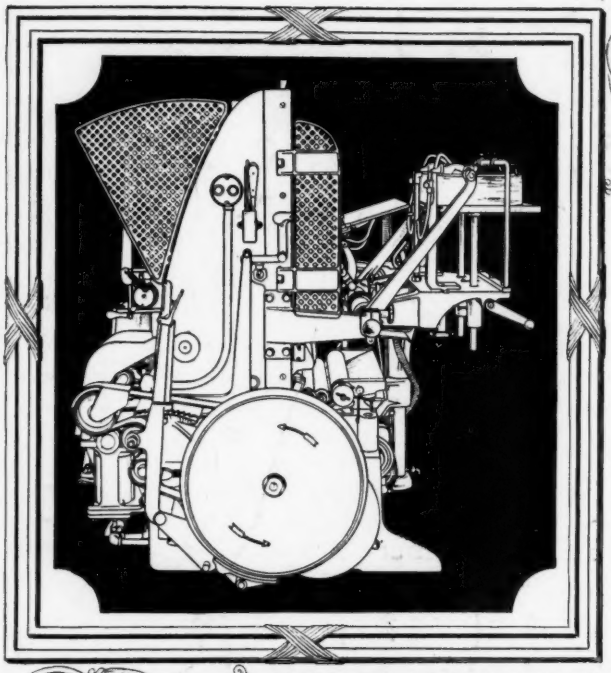

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